THE PAPER INDUSTRY
and PAPER WORLD
AN EDUCATIONAL NEWS MAGAZINE—AUGUST, 1942

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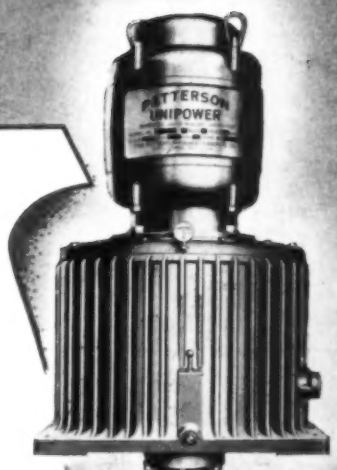
DETROIT

WAR PRODUCTION *demands*

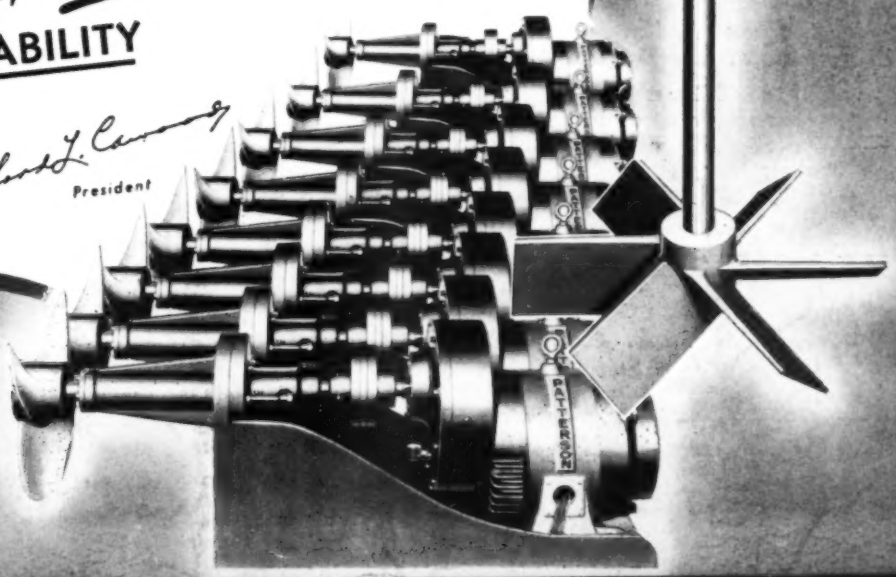
THOROUGHBRED PERFORMANCE
UNDER RELENTLESS
PRESSURE!




PATTERSON
*High Production*
MACHINERY

—NOT ONLY SHORTENS TIME ON YOUR VITAL PROCESSING JOBS, **BUT** PERFORMS WITH PRICELESS ADAPTABILITY AND ENDURANCE

Richard L. Cameron
President



SATISFACTORY PATTERSON MACHINERY

THE PATTERSON FOUNDRY
AND MACHINE COMPANY
EAST LIVERPOOL, OHIO, U. S. A.

It is high time that great honor be paid the humble oil can!

Too often, back in those lush, pre-priority days, the oil can suffered the humiliation of serving as a prop for cobwebs.

With oil cans serving spiders instead of machines, working parts fell prey to their greatest enemy FRICTION.

For lack of oil at the proper time and place, untold years of potential machine life were lost forever.

Then WAR came. Entered the era of critical materials, priorities, allocations, and machine scarcity. Old machines became almost priceless wherever money alone could not buy new ones.

But old machines cried loudly for relief from their time-worn enemy FRICTION. So the oil can was taken away from the spiders to serve their real masters —the machines.

Yes—it took WAR to bring the humble oil can into the spotlight *where it belongs!*

All it asks is plenty of good oil and a friendly hand to press it into service.

Like all machines designed for high standards of performance, Seybold Paper Cutters return dividends from proper maintenance. That's why we say "Orchids for Oil Cans."

SEYBOLD PAPER CUTTERS

HARRIS-SEYBOLD-POTTER CO. · 3333 ARLINGTON ST. · DAYTON, O.

**SEYBOLD SALES AND SERVICE**

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**West Coast Distributor:** HARRY W. BRINTNALL COMPANY, San Francisco, Los Angeles, Seattle

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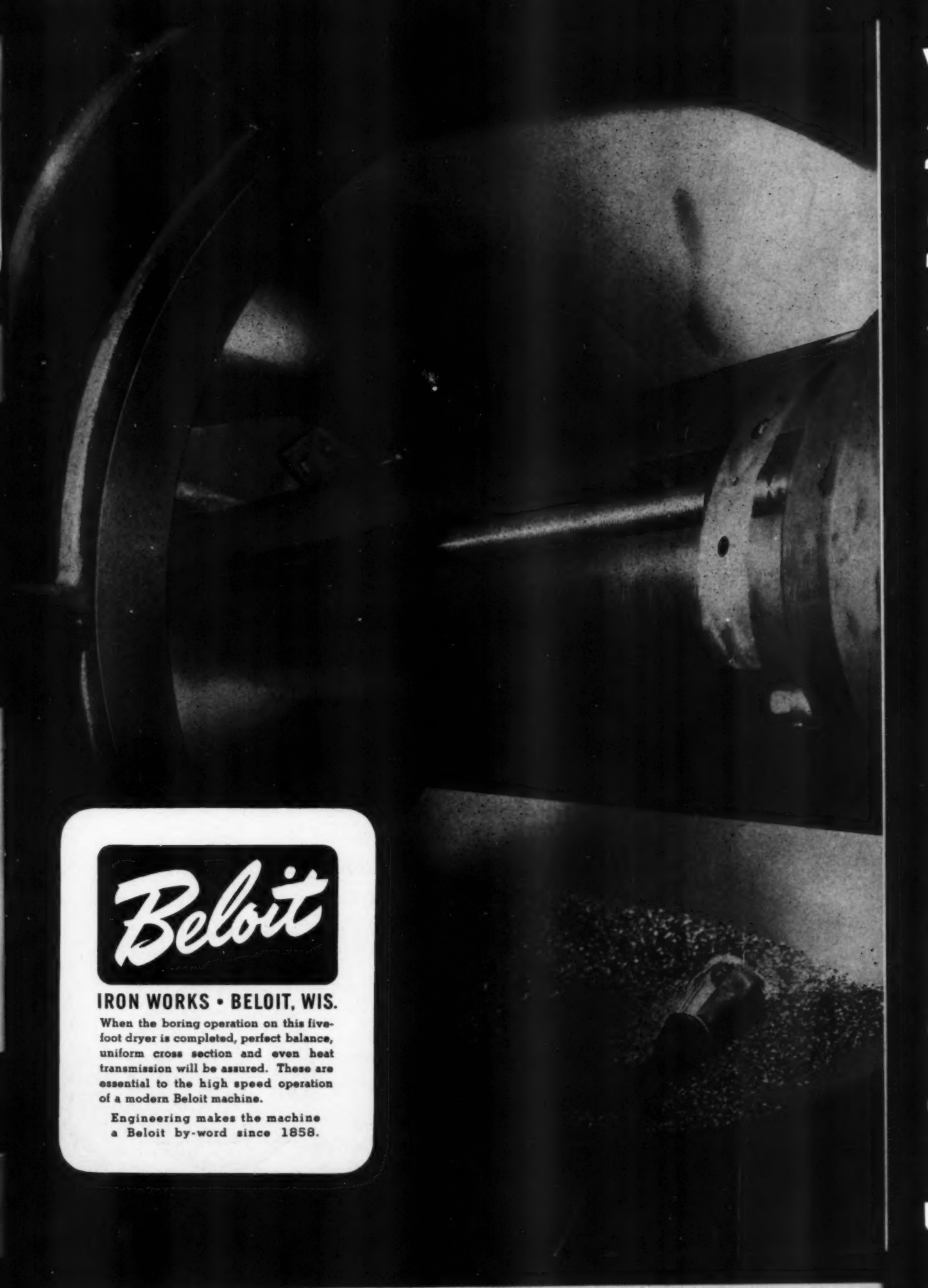


Beloit

IRON WORKS • BELOIT, WIS.

When the boring operation on this five-foot dryer is completed, perfect balance, uniform cross section and even heat transmission will be assured. These are essential to the high speed operation of a modern Beloit machine.

Engineering makes the machine a Beloit by-word since 1858.

# NAVY "E" AWARDED TO DE LAVAL

In the United States Navy, the highest of all honors is the Navy "E", the emblem of excellence awarded for supremacy in gunnery, communications and engineering.

Until recently the Navy "E" has been restricted to personnel of the United States Navy.

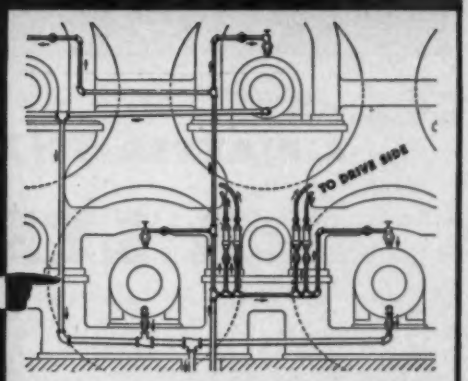
By special permission of Franklin D. Roosevelt, President of the United States, and Frank Knox, Secretary of the Navy, the Navy has awarded the Navy "E" to the De Laval Steam Turbine Company for outstanding excellence in industrial production.

The De Laval plant at Trenton, New Jersey, is now permitted to fly the All-Navy burgee, while each employee has received the special Navy "E" lapel insignia in evidence of a job "WELL DONE".

DE LAVAL STEAM TURBINE CO. TRENTON, N.J.

# COOLER BEARINGS CLEANER OIL LINES

## *Assure Continuous Output*




NEW! S. F. Bowser & Company system using Pressure Sight Feed Oilers for convenient, remote control of oil feed to inaccessible drive-side bearings.

Your dryer roll bearings, continuously flooded with cool oil, circulated through clean oil lines, are assured of positive protection when you use *Texaco Ursa Oils.*

For *Texaco Ursa Oils* resist sludging and breakdown even under today's stepped-up speeds and higher drying temperatures. They keep oil lines open, filter easily and assure cooler running bearings and continuous output.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred by prominent pulp and paper mills everywhere.

These Texaco users enjoy many benefits that can also be yours. A Texaco Lubrication Engineer will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distribution points in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.

Cars for your Car ..for your Country

### THEY PREFER TEXACO

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

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★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

Tune in the TEXACO STAR THEATRE every Sunday night—CBS

# TEXACO Lubricants and Fuels

## FOR THE PAPER INDUSTRY

HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

## A PIONEER THEN—

# A LEADER TODAY

IN 1892, in a Virginia valley noted for its vast deposits of pure salt, Mathieson began the construction of the first of three great factories. Over a period of half a century, they were to supply America's growing industries with vital chemicals. Today—fifty years later—the Mathieson plants at Saltville, Va., Niagara Falls, N.Y. and Lake Charles, La., are working twenty-four hours a day to supply the nation's *war* industries with the "raw materials of victory."

This is the over-all picture of a typically American enterprise—The Mathieson Alkali Works. It is a story of growth and progress in chemical research... in developing new products... and in devising more efficient methods of handling and transporting chemicals.

Among Mathieson's early achievements was the development of the Castner electrolytic cell for producing chlorine and extremely pure caustic soda. The first to make bleaching powder in the United States, Mathieson pioneered the manufacture of synthetic ammonia, liquid chlorine and such outstanding chlorine products as calcium hypochlorite and sodium chlorite. Chlorine, today in great demand for war production, is also safeguarding the health of our fighting men on all fronts as calcium hypochlorite, the *mobile* chlorine carrier.

These are but a few milestones in the fifty years of Mathieson Chemicals. They are tangible evidence of the drive and initiative which have marked Mathieson's rise from modest beginnings to a place of leadership in the field of industrial chemicals.

CELEBRATING 50 YEARS OF SERVICE TO AMERICAN INDUSTRY AND PUBLIC HEALTH

## MATHIESON CHEMICALS

The Mathieson Alkali Works, (Inc.) 60 East 42nd Street, New York, N.Y.

# THE PAPER INDUSTRY and PAPER WORLD

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ADVERTISING REPRESENTATIVES

*Eastern Office*
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From their easy-to-grip hand-wheels to their generously oversized bodies; —from their extra heavy wear - resisting bronze stems to their husky Union Bonnets;—from their precisely machined bronze glands and extra deep stuffing boxes to their specially constructed discs, O.I.C. Valves will pay you dividends the minute they go on your lines.

Replace now with O.I.C. Join the growing number of users . . . all of whom are saying:

*"Oh I See! Lower Costs with O.I.C."*

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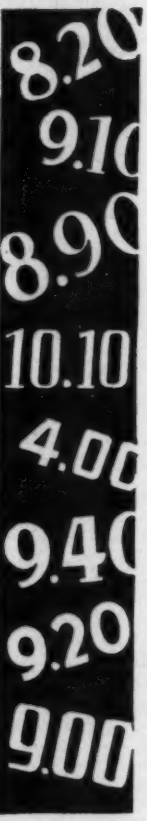
You will find this manual a time and trouble saver. For example—if your "End Use" is in the power field, your Symbol may be 9.10; or — in the petroleum field you may require a Symbol 9.20; or — in the chemical processing field your Symbol may be 8.20 and in the paper and pulp industry, it may be 8.90.

Just write to us on your company letterhead, and we shall gladly send you your copy without obligation . . . or you may obtain a copy from your nearest O.I.C. Distributor.

And always remember . . . there's a sturdier O.I.C. Valve for your every "End Use" that will insure you:

★ Longer Uninterrupted Service
★ Lower Replacement Cost
★ Lower Maintenance Cost
★ Minimum Over-all Cost




OIC

THE OHIO INJECTOR COMPANY
WADSWORTH, OHIO
*Quality Leaders in Valve Manufacture Since 1883*

In an advertisement which appeared during September of last year, we said: *"A shortage of copper is driving our way."*

The shortage has struck. The last quarter of 1942 will see our supply of both copper and tin considerably reduced. The cut for 1943 threatens to be enormous.

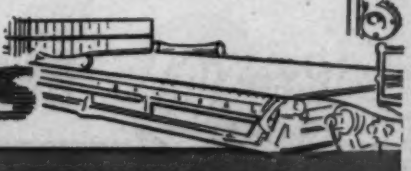
Our government has already limited the ratio to four wires per Fourdrinier machine. The present average is much higher than that. Only one sane course is placed before us; namely, that *every one of us shall apply the utmost care* to the use of every piece of equipment and every ounce of material. The government has gathered a vast fund of data to aid you, and us, in conserving our facilities and resources. Let us take advantage of this assistance.

Only one more step remains—to shut off the spigot altogether. *Such acts are performed suddenly.* Even the trickle may stop.

**THE LINDSAY WIRE WEAVING COMPANY**

*Serving the Paper Industry Since 1903*

14001-14299 Aspinwall Avenue • • • Cleveland, Ohio



*Lindsay* **WIRES**

FOR PAPER MILLS

## TO EXECUTIVES:

# NOW YOU CAN HELP

# *Even More...*

**New Treasury Ruling Permits Purchases UP TO $100,000, in any Calendar Year, of Series F and G WAR BONDS!**

The Treasury's decision to increase the limitations on the F and G Bonds resulted from numerous requests by purchasers who asked the opportunity to put more money into the war program.

This is not a new Bond issue and not a new series of War Bonds. Thousands of individuals, corporations, labor unions, and other organizations have this year already purchased $50,000 of Series F and G Bonds, the old limit. Under the new regulations, however, these Bond holders will be permitted to make additional purchases of $50,000 in the remaining months of the year. The new limitation on holdings of $100,000 in any one calendar year in either Series F or G, or in both series combined, is on the cost price, not on the maturity value.

Series F and G Bonds are intended primarily for larger investors and may be registered in the names of fiduciaries, corporations, labor unions and other groups, as well as in the names of individuals.

The Series F Bond is a 12-year appreciation Bond, issued on a discount basis at 74 percent of maturity value. If held to maturity, 12 years from the date of issue, the Bond draws interest equivalent to 2.53 percent a year; computed on the purchase price, compounded semiannually.

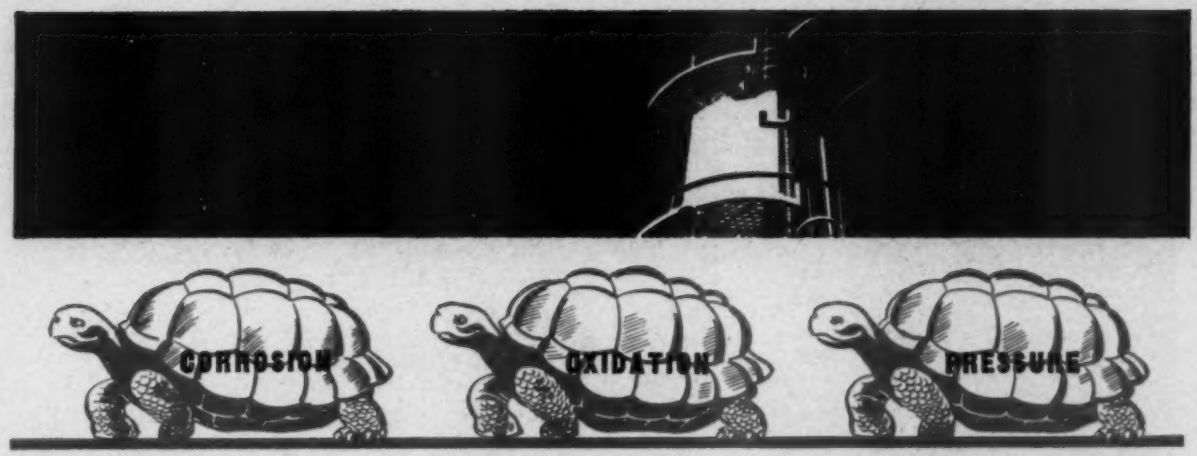
The Series G Bond is a 12-year current income Bond issued at par, and draws interest of 2.5 percent a year, paid semiannually by Treasury check.

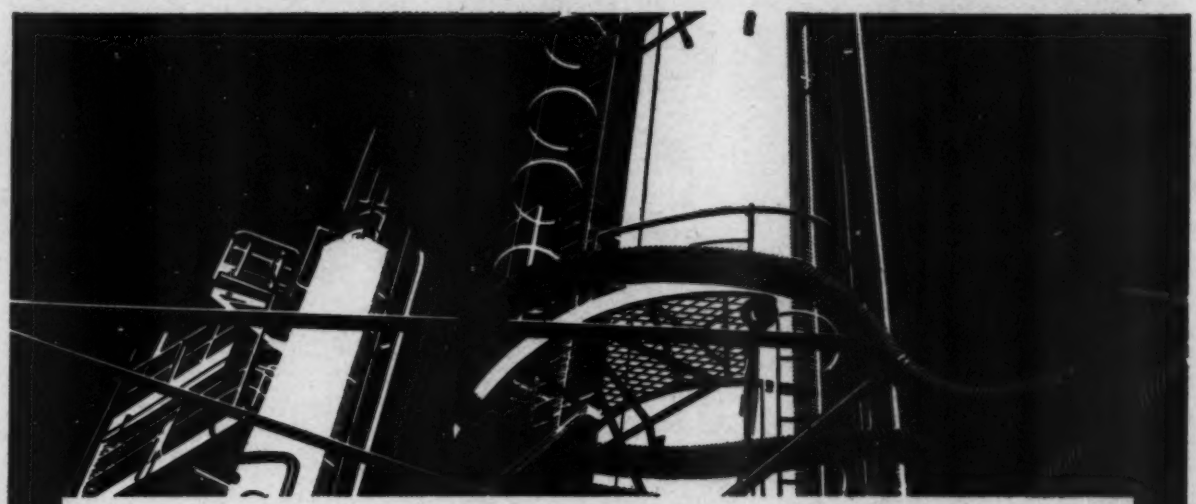
Don't delay—your "fighting dollars" are needed *now*. Your bank or post office has full details.

Save With . . .

# War Savings Bonds

This space is a contribution to America's All-Out War Program by THE PAPER INDUSTRY and PAPER WORLD



# SLOW.. BUT SURE!

Corrosion, oxidation and pressure may be *slow*, but they are *sure* enemies of refinery, power, chemical and paper tubes.

Your best defense is proper application of this little formula — take your *tube cost*, divide by *tube life*, and you will discover your exact *tube expense.*

Compare your tube expense with data taken from our file of hundreds of case histories and you can know whether your tubes *cost too much* or *are not good enough for the job they are required to do.* Consult us without obligation.

**THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO**
**Steel and Tube Division**

$\frac{TC}{TL} = TE$

Proper use of this formula will bring VICTORY today and win profits in post-war competition.

**TIMKEN**
TRADE-MARK REG. U. S. PAT. OFF.
*SEAMLESS STEEL TUBES*

# Huyck Felts

SINCE 1870

QUALITY FELTS FOR EVERY PULP & PAPER-MAKING PURPOSE

## F. C. HUYCK & SONS

*Established 1870*

KENWOOD MILLS · ALBANY, N. Y.

IN THE BATTLE FOR PRODUCTION

*dependable* **DIAMOND**

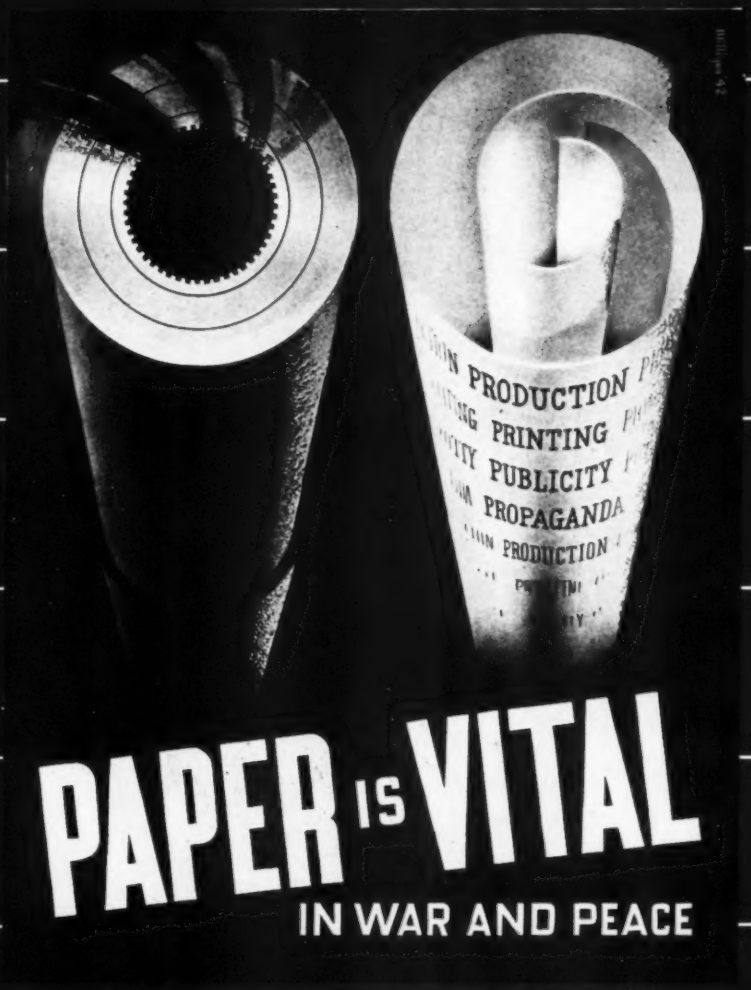
*soda ash*

AIDS SMOOTH FLOWING,

HIGH SPEED OPERATION

ALKALI

DIAMOND ALKALI COMPANY, PITTSBURGH, PA., AND EVERYWHERE




*Paper has become a universal necessity.*

*Or rocked by the holocaust of war,*

To give widespread publicity to this important message, The Mead Corporation commissioned the artist, John Atherton, to design this striking poster.

# TRADE WINDS

## . . Washington News . .

### CONCENTRATION OF PRODUCTION

Whether the War Production Board's new program of concentration of manufacture in selected mills will affect the paper industry is a burning question within the industry. At present, efforts to limit output of civilian goods has been attained principally through uniform reduction of production imposed on all manufacturers. However, on July 23, Donald M. Nelson announced that the new principle will establish a policy of selective limitation wherever possible, with essential civilian production concentrated in certain plants and regions. The proposed steps will be taken wherever some or all plants in a given industry are needed for war production and can be so used, where permissible production is so restricted that economic operation of all firms is not possible, and when a significant part of the production is concentrated in areas where there are bottle necks in labor, transport power or other facilities. There is no hint given as to the nature of the plants which may be affected by this policy, but there is a definite fear that the present low ratio of operation in the paper industry may cause paper mills to be given more intensive study by those responsible for this new program than would be the case if production had continued at the scale prevailing early in the year.

### WPB ORDERS CHANGE IN PULP SHIPMENTS

A radical change in shipments of wood pulp during August has been ordered by the War Production Board. Cross hauls in the shipments of book and bond grades of bleached sulphite have been eliminated to such an extent that it is estimated 100,000 miles of rail haul will be saved. This result will be achieved by the interchange of eastern and western bleached sulphite, by a program which will eliminate the shipment of West Coast pulp to the New England mills, and the shipment of eastern pulp to consumers in the middle west.

About 2,500 tons of pulp will be diverted under this program, and no mill will be seriously affected, the elimination of cross hauls affecting only grades of pulp which are practically interchangeable.

At the same time this order was issued, the Office of Price Administration took steps to maintain existing pulp ceilings by an interpretation of the provision for pricing of pulp at the seller's point of shipment. The interpretation is intended to prevent the addition of local transportation charges to the base price for pulp.

▶▶▶ STANDARDIZATION of book and writing papers became compulsory on July 24, with definite limitations on permissible sizes and weights. The fact that some mills had not voluntarily restricted their output to the figures accepted by other mills resulted in the obligatory inclusion of non-co-operating producers in the production which had been voluntarily standardized by the majority of the mills.

▶▶▶ THE LONG PENDING QUESTION of pulpwood trucking has been solved. When orders requiring all freight trucks to secure return loads if they were to operate was proposed it was pointed out that pulpwood trucks cannot get return loads from the mills to the woods. The dates when the proposed order would go into effect were repeatedly deferred, and now all provisions for return loads have been eliminated from the transportation regulations.

▶▶▶ A COMMITTEE including several outstanding trade association executives, none of whom are from the paper industry, has been named by the WPB to investigate the question of Government questionnaires, and to find some method of reducing this burden on manufacturers to a minimum. One large company has reported that it is costing upward of $100,000 a year in employment and time to furnish the forms called for by Government agencies, in many cases such requests being duplicated by different agencies.

▶▶▶ CANADA AND the United States have worked out a pooling arrangement by which Canadian labor will be available for work in American pulpwood cutting regions. A total of 3,700 such workers will be distributed among northeastern employers by the United States War Manpower Commission.

▶▶▶ THE QUESTION OF price "roll backs" has begun to worry paper mills. Two such orders have been issued by the Price Administration. One reduces the price which can be paid for pulpwood, with a view to eliminating the upward bidding of mills for available wood. The other

order, more specifically affecting paper, restores the price of kraft wrapping paper to that prevailing in October, instead of the higher prices previously allowed on the basis of early 1942 markets.

▶▶▶ CHICAGO METROPOLITAN OFFICE of the OPA was opened August 1 at 228 N. LaSalle Street. Wm. H. Kidder has been transferred to that office from the Chicago Regional Office. He will continue to handle all matters pertaining to Paper and Paper Products from the new office for both the Metropolitan area of Chicago, and the region consisting of the following states: Illinois, Wisconsin, Minnesota, North and South Dakota, Iowa, and Nebraska.

▶▶▶ THE INDUSTRY ADVISORY Committee of the Pulp and Paper Industry met with the Pulp and Paper Branch and other war agency representatives in Washington July 13-14. The personnel of the Committee included five new members in accordance with the policy of replacing five members of the Committee every quarter. The realignment of the WPB was explained, and in connection with the realignment, the Pulp and Paper Section of the Special Industrial Machinery Branch has been transferred to the Pulp and Paper Branch.

▶▶▶ PERSONNEL CHANGES affecting the pulp and paper industry have been made during the past month. John R. Kimberly, formerly head of five industry branches, has been advanced to Chief of the Industry and Commodity Divisions of the War Production Board, as part of the new organizational setup of the board. He is also assistant to Amory Houghton, who is in charge of all operations of the board. James A. Perkins, on leave of absence from Princeton University, has become Price Executive for the Paper and Paper Products Branch of OPA, succeeding Robert M. Macy who has been transferred to the Office of the Quartermaster General, in the Production Service. John Maloney, Jr., assistant sales manager of the Hoberg Paper Mills, Green Bay, Wisconsin, has become an advisor in the Pulp and Paper Branch of WPB, in the toilet, towel and napkin sections.

◆

▶▶▶ SEVENTY-SIX MEN IN SERVICE, former employees of the Graham Paper Company of St. Louis, Missouri, receive a semimonthly news letter from the company. In addition, Graham sends each one a large box of candy, cookies, cigarettes, stationery, gum, and shaving lotion on his birthday.

## LIST OF APPROVED PULP TESTERS

▶▶▶ The Certified Pulp Testers' Bureau of New York City has sent out the following list of 1942 certified pulp testers as approved by them:

### Pulp and Paper Mill Laboratories

| | |
|---|---|
| Bailkowsky, H. W. | Weyerhaeuser Timber Co., Pulp Div., Everett, Wash. |
| Barber, William Richmond | Crown Willamette Paper Co., Camas, Wash. |
| Bradford, Harry C. | Rex Paper Co., Kalamazoo, Mich. |
| Clark, Clarence T. | Restigouche Co., Ltd., Campbellton, N. B. |
| Connor, C. M. | Glassine Paper Co., West Conshohocken, Pa. |
| Coster, N. W. | Soundview Pulp Co., Everett, Wash. |
| Ebersole, William M. | St. Joe Paper Co., Port St. Joe, Fla. |
| Enghouse, Clarence A. | Crown Willamette Paper Co., West Lynn, Ore. |
| Foster, C. E., Jr. | Oswego Falls Corp., Fulton, N. Y. |
| Hartnagel, Nelson | Fibreboard Products, Inc., Port Angeles, Wash. |
| Logan, K. C. | Pacific Mills, Ltd., Ocean Falls, B. C. |
| Mason, Oren A. | Port Royal Pulp & Paper Co., Ltd., Fairville, St. John, N. B. |
| Olmsted, F. A. | Crown Willamette Paper Co., Camas, Wash. |
| Quinn, Joseph | Union Bag & Paper Corp., Hudson Falls, N. Y. |
| Steadman, B. K. | Standard Paper Mfg. Co., Richmond, Va. |
| Stevens, R. H. | National Container Corp., Jacksonville, Fla. |
| Tennent, G. R. | Hummel-Ross Fibre Corp., Hopewell, Va. |
| Weleber, F. J. | Hawley Pulp and Paper Co., Oregon City, Ore. |
| Wood, Edward P. | Weyerhaeuser Timber Co., Pulp Div., Longview, Wash. |

### Commercial Laboratories

| | |
|---|---|
| Andrews, A. B. | Box 57, Lewiston, Maine |
| Cellulose Products Laboratory (E. D. Rich, Director) | 754 Broadway, Tacoma, Wash. |
| Danneker & Evans, Inc. | 309 Camp St., New Orleans, La. |
| Donald & Co., Ltd., J. T. | 1181 Guy St., Montreal, Canada |
| Hamlin & Morrison | 216 South 2nd St., Philadelphia, Pa. |
| Hanks, Inc., Abbot A. | 624 Sacramento St., San Francisco, Calif. |
| Hersey Co., Ltd., Milton | 980 St. Antoine St., Montreal, Canada |
| Knudsen, K. Hv. | 87 Gold St., New York, N. Y. |
| Orthmann Laboratories, Inc. | 647 W. Virginia St., Milwaukee, Wisc. |
| Priestley, J. G. | NW Testing Laboratories, 2nd Ave. & James St., Seattle, Wash. |
| Schwantes, Everett J. | Gulick-Henderson Co., Inc., 431 S. Dearborn St., Chicago |
| Skinner & Sherman, Inc. | 246 Stuart St., Boston, Mass. |
| U. S. Testing Co., Inc. | 1415 Park Ave., Hoboken, N. J. |
| Wiley & Co., Inc. | 904 N. Calvert St., Baltimore, Md. |
| Whittington, E. F. | 530 West Cedar St., Kalamazoo, Mich. |
| Williams Apparatus Co., Inc. | Herald Bldg., Watertown, N. Y. |

## NEW METHOD MAKES FIBER CANS WITHOUT CHANGING MACH'Y

A new method for the making of cans with fiber bodies on machines used for the manufacture of metal containers has just been developed by the American Can Company, New York City.

Besides providing a substitute for tin and metal containers now restricted by the various government orders, the greatest merit, perhaps, of this new method is that no new machinery is required—fiber sheets are fed into existing machines geared for manufacturing metal cans, and a reasonable facsimile of the old container is contained. Existing packaging machinery may also be used. By this method, too, the size and shape of the container will be preserved, preventing loss of distribution because of failure of the consumer to recognize the product.

The American Can Company states that the new method will be turned over to the entire can-making industry for the duration so that the demands of trade may be met throughout the country during the emergency.

◆

## SCOTT PAPER CO. TO OPERATE PULP MILL IN QUEBEC

To meet the increasing demand for paper products, the Scott Paper Company of Chester, Pennsylvania, in connection with Donohue Brothers, Ltd., has put into operation a groundwood pulp mill at Clermont, Quebec. John Stadler, of Montreal, was the designing and construction engineer.

Pulp from this new source will be of the highest quality and is vitally necessary to the increasing demand for the products of this company and its subsidiaries at Marinette, Wisconsin, and Glens Falls, New York.

PAPER · · · America's 6th Industry

# BUY A SHARE OF FREEDOM

(NEWS ITEM: *The paper used in printing War Bonds now outstanding would weigh over two million pounds.*)

Freedom—$18.75 per share. It takes thousands of tons of paper to print War Bonds. Millions of paper stamps are issued, together with the paper books to paste them in.

More tons of paper are needed to explain how the stamps and bonds can be obtained, how much interest they pay, how they will be redeemed. Paper posters appear in banks, store windows, war plant bulletin boards, telling us about our proud privilege of investing in "America, Preferred."

The Bonds of Freedom are paper bonds . . . the finest paper that America's great Paper Industry can produce.

Today's wear and tear upon the machinery of the Paper Industry is a result of all-out production for Victory. To prevent any let-down in quality or quantity of production . . . to maintain and even increase the flow of paper products for the war effort, Puseyjones engineers are at your service.

A mill manufacturing kraft bag and wrapping paper is getting better and more uniform formation as the result of installing a Puseyjones Flow-Spreader in a large fourdrinier machine. With the Puseyjones Flow-Spreader, the entire flow comes from one pipe and is spread smoothly and evenly across the machine by a simple nozzle construction without use of multiple inlets, baffles and other flow distributing devices.

Keeping paper production at the point of highest efficiency is not only essential to Victory, but also best for the tremendous competition coming after the present emergency is over.

*All orders subject to priority conditions of War Production Board.*

**THE PUSEY AND JONES CORPORATION**

**Established 1848. Builders of Paper-Making Machinery**

**Wilmington, Delaware, U.S.A.**

THE SIGN OF TRADE MARK SUPERIOR QUALITY

## NAT. CONTAINER DEDICATES CENTER

Independence Day was an extra special Fourth of July for the employees of the Kraft Pulp and Board Division and the Southern Container Division of the National Container Corporation, Jacksonville, Florida. On that day, elaborate ceremonies marked the formal dedication of the company's new recreation center.

This fine recreation center has been presented to the employees because Samuel Kipnis, the company's president believes in planned recreation.

This building measures 100 ft. long by 60 ft. wide and has over 5,000 ft. of floor space. There is a large stage at one end with dressing rooms making it suitable for amateur theatricals, musicals, etc. The rear of the building is divided into rest rooms, showers, and equipment rooms for men and women. Sports equipment includes wrestling mats, punching bags, flying rings, weights, and other apparatus. Musical instruments include piano and organ.

Connected with the main building by a canopied walk is a smaller frame building in which the recreation activities were formerly housed. This now contains a cafeteria. Here also is the office of Marvin A. Lewis, recreation director. Adjoining his office is a 1,000 book library with current magazines.

On a specially acquired adjacent lot, there is one of the finest baseball diamonds in the South with grandstand ample for 500 spectators.

The dedication ceremonies were distinctly patriotic. After the welcome address by Mayor John T. Alsop, Jr., the company's honor roll of men in the armed forces was unveiled by R. H. Laftman, vice president and general manager of the Kraft Pulp and Board Division. Following the dedication address by Samuel Kipnis, the president of the local Papermakers Union, with a detachment of U. S. Marines as guard of honor, marched to the front bearing a beautiful American Flag which the employees presented to the Center.

The National Container Corporation is credited with being the first concern in Florida employing more than 500 persons to sign up 100 per cent for the U. S. Treasury's 10 per cent payroll allotment plan. According to an announcement, this gives the company the authority to fly the Minute Man Flag.

*RIGHT—R. H. Laftman standing beside the company's Honor Roll which he unveiled during the dedication of new Recreation Center.*

*LEFT—During ceremonies attending the dedication of the National Container Corporation's new Recreation Center, Jacksonville, Florida, the president of the local papermakers union presented a beautiful American Flag, the gift of the employees. A detachment of U. S. Marines served as Guard of Honor.*

## FINANCIAL

Despite a generally weak securities market during July, paper mill securities did not feel the effects of the Russian war developments and other adverse events to any serious extent. As a matter of fact, the paper mill securities ended the month rather stronger than at the outset.

*Celotex Corporation*—Net profit for the six months ended April 30, 1942, was $518,013 as against $761,235 for the same period in 1941.

*Container Corporation of America*—Net profit for the six months ended June 30, 1942, was $1,782,585 as against $1,170,296 for the same period in 1941.

*Robert Gair Company, Inc.*—Profit for the six months ended June 30, 1942 (including United States subsidiaries) was $381,512.59, after depreciation, interest and dividends of subsidiary company, and provision of $1,538,000 for federal income and excess profits taxes, but before interest on income notes.

*Kimberly-Clark Corporation*—Net profit for six months ending June 30, 1942, was $1,039,855 as against $1,280,047 for the same period in 1941.

*Masonite Corporation*—Net profit for the quarter ending June 6, 1942, was $510,215 as against $534,591 for

# *NOW is the time to make the most of your* BIRD MACHINERY

**BIRD SCREENS** are your strongest barrier against the increased dirt that's bound to occur in your paper stock. Make sure they are in first class operating condition and keep them that way.

**BIRD SAVE-ALLS** help you to turn every pound of good stock into paper instead of into the sewer. Keep them in shape to do this important conservation job at lowest net cost.

**VICKERY FELT CONDITIONERS** prevent needless paper machine shut-downs by keeping press felts continuously clean and open. Check up on your Conditioners so as to be sure they're functioning with top notch efficiency at all times.

**VICKERY DOCTORS,** properly applied, keep every papermaking roll in shape to do its best work. See that they're installed and operating as they should be and assure yourself of better production, fewer breaks and longer roll service.

*For information and assistance in connection with the operation and maintenance of your Bird Machinery throughout the emergency, get in touch with*

## BIRD MACHINE COMPANY
SOUTH WALPOLE · MASSACHUSETTS

the same quarter in 1941. In the 40-week period ending June 6, net profit was $1,297,182 as against $1,180,085 for the same period in the previous fiscal year.

*Mead Corporation*—All of the outstanding stock of the Escanaba Paper Company, the bulk of whose securities are already held by Mead Corporation, has been purchased by the Mead Corporation with an exchange of Mead securities.

*Rayonier, Inc.*—Net profit for the year ending April 30, 1942, was $3,762,970 as against $4,005,871 for the preceding year. This decrease in net earnings was in the face of an increase in sales of $6,000,000 with operation at capacity levels, the decreased net being due to greatly increased federal income and excess profits taxes.

**New York Stock Exchange—Stocks**

| | Closing Prices July 25 | June 25 |
|---|---|---|
| A. P. W. Paper Co. | 1⅜ | 1⅜ |
| Celotex | 6¾ | 7 |
| Same Preferred | 69 | *68–69½ |
| Certain-teed | 1⅞ | 2 |
| Same Preferred | 25⅞ | *24½–24⅞ |
| Champion P. & F. Co. | 14¾ | *14⅜–14⅝ |
| Same Preferred | 98 | *94½–99 |
| Container Corp. | 12½ | 12 |
| Cont. Diamond | 6¾ | 6⅞ |
| Crown Zellerbach | 10¾ | 10⅜ |
| Same Preferred | 81¾ | *77½–80 |
| Dixie Vortex | 8¾ | *8¼–8⅜ |
| Same "A" | 34½ | 33½ |
| Robert Gair | 1⅜ | *1½–1¾ |
| Same Preferred | 9½ | *9⅛–10 |
| Gaylord Container | 9⅞ | *8¼–9⅜ |
| Same Preferred | 50 | *49½–50½ |
| International Paper | 9¾ | 9¼ |
| Same Preferred | 49¼ | 47 |
| Kimberly-Clark | 24½ | 24½ |
| MacAndrews & Forbes | 16⅜ | *17–19 |
| Masonite | 27 | *25¼–25¾ |
| Mead Corp. | 6½ | *6⅜–6⅝ |
| Same Preferred | *72–74 | *68–76 |
| Paraffine Cos. | 28 | 25½–28 |
| Same Preferred | 95 | *90½–100 |
| Rayonier | 9¼ | 8¼ |
| Same Preferred | 24⅜ | *23½–24½ |
| Scott Paper | 32¾ | *30¾–32½ |
| Same 4½% Pfd. | 114 | *112½–116 |
| Same 3% Pfd. | 108 | *107–109 |
| Sutherland Paper | 21¾ | *19–19½ |
| Union Bag & Paper | 8¼ | 8 |
| U. S. Gypsum | 51½ | *47–47¼ |
| Same Preferred | 169¼ | *165–170 |

**New York Stock Exchange—Bonds**

| | | |
|---|---|---|
| Abitibi 5% | 50¼ | 48½ |
| Celotex 4½% | 98¾ | 97¾ |
| Certain-teed 5½% | 90¼ | ..... |
| Champion P. & F. Co. 4¾% | 103 | ..... |
| International Paper 5% | 104 | ..... |
| Same 6% | 104¾ | 104¾ |

**New York Curb Exchange—Stocks**

| | | |
|---|---|---|
| Am. Boxboard | 3¾ | ..... |
| Great Northern | 27¼ | ..... |
| Hummel Ross | 3 | 3⅛ |
| Nat. Container | 8⅛ | ..... |
| St. Regis | 1⅜ | 1⅜ |
| Taggart | 2⅞ | ..... |
| United Wall Paper | 1¼ | 1⅛ |

*Closing Bid and Asked Prices.

*Moving concern inching new Yankee dryer roll up on timber cribbing to the second floor at Hoberg Paper & Fiber Company. A 15-ft. section of the brick wall was removed to move the roll into the building.*

## NEW YANKEE DRYER ROLL AT HOBERG

The Yankee dryer roll, shown in the accompanying illustration, is to be installed on No. 4 genuine crepe machine at Division A plant of Hoberg Paper & Fiber Company, Green Bay, Wisconsin.

The roll weighs 30 tons; it is 10 ft. in diameter; 140-in. face, and was made by Beloit Iron Works, manufacturer of the original machine. The unit is made for 75 pounds steam pressure, against the old one of 40 pounds, and will permit a speed-up in production. The present roll is being returned to the Beloit Iron Works for repairs, and will be used as a spare.

◆

## I. P. CO. WILL KEEP $50 PRICE ON NEWSPRINT

International Paper Company, New York City, has informed its customers that the prevailing price of $50 a ton for newsprint would be continued until further notice. The company pointed out that, "The plans adopted by the Government for the control of prices generally create an entirely new influence on the marketing of most commodities, including newsprint. In view of this government policy, and since we have no means of knowing in advance what ultimate conclusions will be reached or what changes may be made from time to time, we now wish to advise you that we shall continue our present standard price at your destination until further notice."

It is expected that other newsprint manufacturers will follow International's lead despite the application of Canadian manufacturers for an advance in price.

◆

## BOX MFRS. ACT TO PROMOTE USE OF PAPER & BOARD

The National Paper Box Manufacturers Association has recently released a statement by William W. Fitzhugh, chief of the setup and folding paper box section, Containers Branch of the War Production Board, to the effect that in view of the present abundant supply of paper and paperboard, no restrictions on the manufacture of any type of paper box are contemplated, and the use of gift and Christmas boxes are not prohibited.

Many retailers have been purchasing boxes quite sparingly, even though they are cognizant of the fact that there has been a surplus of these raw products on the market, except during a relatively brief period last fall and winter, and many stores are sending out their merchandise to customers in second-hand boxes, bearing stickers citing the now age-worn excuse that

# Below DECKS

THERE are not many valves in the Gun Stations and Fighting Tops of America's Warships. But below decks, where the engines stay, there are valves by the hundreds. That they perform their functions dependably and well is as essential as is the performance of many another piece of equipment more easily seen, more often mentioned.

So it is in power plants, refineries, powder plants, chemical industries. Each depends on the precise control of the flow of liquids and gases for proper performance. Each depends on valves for this control.

It is small wonder that in time of war, when every ship must sail, when every factory must produce to the limit, that Powell Valves are in such great demand. For Powell Valves are backed by a century of experience, and a proud record of performance. Powell Engineers are trained to anticipate the demands of Industry. In times of peace this service has been a boon to American Industrial Progress. In times of war it is an essential military requirement.

The winning of a war takes a lot that does not show on the surface. Some of this, particularly valve control, is "below decks."

**The Wm. Powell Company**
**Cincinnati, Ohio**

**Figure 1913**—Essentially a Paper Mill Valve—an O. S. & Y. Globe Valve specially designed by Powell and fabricated of Hastelloy to control the flow of chlorine and all chlorinated products. Made with screwed ends (Fig. 1912) and flanged ends (Fig. 1913), in sizes from ¼" to 2", inclusive. Also available in larger sizes, 4" to 12"; as well as Gate, Check, Relief Valves, and Liquid Level Gauges. Details on request.

**POWELL VALVES**

the boxes are used because of the Government's request to conserve paper.

This action has caused considerable unemployment, not only in paper box factories, but in paper and board mills as well. Some producers of paper and board say they are less busy this summer than at any time since 1938, when they experienced a few slack periods.

◆

## DUTY ON PULPBOARD VS. PAPERBOARD

A shipment of pulpboard in rolls from Canada, stated in the documents filed with Customs officials to be for use in the manufacture of pie plates, was claimed by the importer to be dutiable at 5 per cent as pulpboard in rolls for use in the manufacture of wallboard. The officials refused to accept this classification and imposed duty at the rate of 10 per cent for paperboard, according to the Import Committee of the American Paper Industry.

Paperboard imported at Milwaukee, classified for duty at 10 per cent, is claimed by the importer to be dutiable at 5 per cent as pulpboard in rolls for use in the manufacture of wallboard, despite a finding by the Customs officials that the material was to be used in the manufacture of paper boxes. The importer has protested this ruling and asked the United States Customs Court to reverse the Customs officials decision.

◆

## PACIFIC PAPERBOARD TO HAVE NEW OFFICE

A two-story frame office building is under construction at the Pacific Paperboard Company, Longview, Washington. The building will be of frame construction, 40 x 80 feet, with the second floor designed for use as a cafeteria. The present office will be used for storage.

The company recently added a new machine and has just completed a small addition to the plant for use in the manufacture of egg cartons and egg carton fillers.

◆

## I. P. CO. FORT EDWARD MILL WAS CLOSED JULY 10

Salaried and long-time employees of the Fort Edward (New York) mill of the International Paper Company received a bonus in the form of a check amounting to three months' salary when the mill closed July 10.

Although closing of the mill became known several weeks ago, it was expected that operations would continue until August 1. However, operations ceased on the 10th, when the last of the stock was used. A small force is being maintained in the mill and office. Future disposition of the mill property is not known.

◆

## CANADIAN ASS'N OFFICIALS VISIT VANCOUVER, B. C.

R. L. Weldon and A. E. Cadman, president and secretary-manager, respectively, of the Canadian Pulp and Paper Association, recently traveled by plane to Vancouver, British Columbia, marking the first time that officers of the Association have paid an official visit to that province. Several meetings of the executives of the industry in British Columbia were held, and local and mutual industry problems were discussed.

To ensure a closer relationship, it was arranged that a representative of the British Columbia mills be added to the executive committee of the Association, and Lawrence Killam, president and managing director of British Columbia Pulp and Paper Company,


**KNIFE GRINDING**

*For Better Cutting Knives, Lower Operating Costs*

Latest Covel-Hanchett Traveling Wheel Grinder

**Provides the most effective action of any grinding service. Smooth running, short length, compact. Never before so much machine in so little space. . . . Preloaded, precision bearings, protected, force feed lubrication. . . . Paper knives and doctor blades reach a new high in accurate, smooth finish with less stock removed, less grinding expense. Sustained accuracy in grinding operations means less grinding for better results; saves knives, wheels and operating cost. . . . Catalogue on request to the Pioneers in the industry.**

**COVEL-HANCHETT CO.**

**Big Rapids, Mich., U. S. A.**

If you need WATER-ABSORBENCY QUALITIES .... You Need-

# SURFAX W. O.

## Houghton's CONCENTRATED Surface Active Agent

● Its use increases greatly the water absorbency needed in certain types of paper. We call this "wetting-back" speed, for fibres treated with SURFAX W. O. will not only wet out faster, but will also have the property of more rapid water absorption in the finished product.

This chemical helps, too, in dispersing and spreading adhesives and coatings. It thins out solution viscosities. All in all, SURFAX W. O. can be an invaluable help to your manufacturing processes. May we discuss it with you? E. F. HOUGHTON & CO., Philadelphia, Chicago or Detroit.

*Another Use!*

Surfax W. O. may also be used for cleaning kerosene from felts, removing oil and oder.

Vancouver, was elected to act in that capacity. Also, "for the duration" a branch office of the Association, to be known as the Western Branch, was established. It will be in charge of H. J. McKenzie, formerly manager of Export Sales Company, Ltd., Vancouver, who has been appointed an assistant secretary of the Canadian Pulp and Paper Association.

◆

## ADDITION TO THE INSTITUTE IS NOW NEAR COMPLETION

The fourth major addition to the Institute of Paper Chemistry, Appleton, Wisconsin, is rapidly being completed and occupancy is expected to take place before September 1. The unit, exactly the size of the original building, is two stories high and has a well lighted basement with large windows to the south. Much of the physics department will be housed in the new addition as well as a third humidity room and a room for the electron microscope. The second floor will contain an expansion of the semi-commercial laboratory and a large class and lecture room. The top floor will have an expanded analytical and micro-analytical department and fiber microscopy and wood technology divisions.

*The Kimberly-Clark Corporation entered the above float in the Civilian Defense parade held in Appleton (Wis.) on July Fourth. It showed the total number of men from each of the company's mills who at that time were in the armed forces.*

The building is of stone and steel construction, the steel being readily released by the Government because of the large amount of war activity being conducted by the Institute. It is estimated that at least a third of the work being carried on by this institution is directly connected with the war effort.

# BRIEFS

▶▶▶ CO-OPERATING WITH the National Victory Display Program, the Sherman Paper Products Corporation, Newton Upper Falls, Massachusetts, has introduced a complete display set for retailers' windows, the first of a periodic service. The set has been designed to meet the needs of the many retailers who do not maintain a display staff, yet desire a custom-made, economical means of participating in the national program to promote War Bonds and Stamps through the medium of store windows.

◆

▶▶▶ A PLANT ALTERATION and expansion program, at a cost of $15,000, has been started by Westminster Paper Company, Ltd., New Westminster, British Columbia.

◆

▶▶▶ PRIME MINISTER MACKENZIE KING told the House of Commons on July 22, that he will not table the Vining report on Canadian publicity in the United States, stating that it was not intended for the public, but as guidance for the Canadian Government. He said that the report contained information and expressions of opinion from people who would not have spoken had they thought their names and words would be made public.

◆

▶▶▶ A NEW BOAT especially designed for log towing work has been added to the fleet of Pacific Mills, Ocean Falls, British Columbia. The boat was launched from the ways of the Harbour Boat Yards, Ltd., Vancouver, and was built under the supervision of Captain Andy Widsten, marine superintendent for Pacific Mills.

◆

▶▶▶ A TOWBOAT BELONGING TO the Maine Seaboard Paper Company of Bucksport, Maine, was destroyed by fire recently. The fire broke out on the boat while it was towing pulp timber down Sebec Lake. Quick action saved the logs, but the boat and its equipment was lost.

◆

▶▶▶ BRITISH COLUMBIA'S HEMLOCK LOGS, which will be the chief foundation of its economy in the next generation, will not move to the United States for milling, but will be processed in that province. Recently one large movement of logs to the United States was permitted; however, final control of exports rests with British Columbia, and as long as the logs can be milled efficiently at home, they will not be shipped elsewhere.

◆

▶▶▶ THE QUEBEC GOVERNMENT has announced the creation of a Forestry Information Office. Under the direction of Roch Delisle, forestry engineer in the service of the government since 1929, this office will distribute suggestions for forestry utilization among farmers and settlers.

◆

▶▶▶ FIRE-FIGHTERS, aided by a change in weather conditions, succeeded in subduing most of the forest fires which raged in the Province of Nova Scotia in the middle of July. Fires also burned in Prince Edward Island, but they, too, were put out.

◆

▶▶▶ COVERED BARGES are being employed by the Powell River Company of Powell River, British Columbia, to convey newsprint from the up-coast pulp and paper town to Vancouver, where connections are made with transcontinental railways.

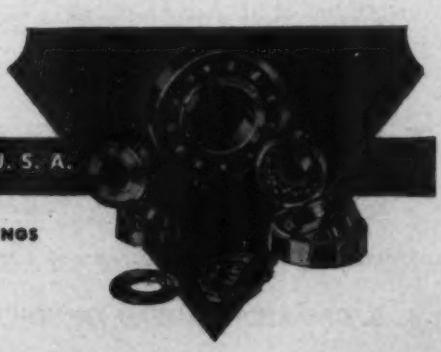
# YOUR MACHINE EQUIPMENT

A treacherous, insidious saboteur lurks in every plant engaged in war production, alert to every opportunity to damage your machines and curtail your output. FRICTION is his name, and your only safeguard against him is the vigilant protection of F.B.I.—FREQUENT BEARING INSPECTION.

Keep all bearings clean and well lubricated. Exclude dust, dirt and moisture. Use only high-grade lubricants. Watch for the first signs of unusual heat or noise or looseness in the bearings. If possible, keep replacement bearings at hand, for a quick substitution if needed. America, in her vast war program, cannot afford to lose a single machine-hour of production. Guard against such losses by FREQUENT BEARING INSPECTION.

We will gladly cooperate with you in maintaining or increasing your production—by experienced counsel on the use and care of anti-friction bearings, and by supplying you, wherever possible, NORMA-HOFFMANN PRECISION BEARINGS for replacements.

*Write for the Catalog. Let our engineers work with you.*



NORMA-HOFFMANN BEARINGS CORP'N., STAMFORD, CONN., U. S. A.
FOUNDED 1911

PRECISION BALL, ROLLER AND THRUST BEARINGS

# —or How To Tell a Stacker!

STACKERS are people who subscribe to publications but seldom read them. They allow unread copies to pile up on window sills or on top of filing cabinets—wasted circulation for advertisers.

Fortunately stackers don't renew. There is nothing that stays the hand from signing a renewal order and another check as effectively as a pile of unread publications.

According to A.B.C. rules, silence *doesn't* mean consent. Subscriptions up to three months in arrears are reported accordingly in A.B.C. reports and after that the subscriptions are stopped or reported under the heading of "unpaid distribution". Non-readers can get on the list of an A.B.C. paper but few stay on.

**SEND THE RIGHT MESSAGE TO THE RIGHT PEOPLE**

**Paid subscriptions and renewals, as defined by A.B.C. standards, indicate a reader audience that has responded to a publication's editorial appeal. With the interests of readers thus identified, it becomes possible to reach specialized groups effectively with specialized advertising appeals.**

This regular report on the extent of reader interest, as expressed by renewals and governed by the advertisers' own definition of paid circulation, is just one of the reasons why a business paper's membership in the Audit Bureau of Circulations is so helpful to both advertisers and publishers.

This business paper is a member of the Bureau. In addition to the percentage of renewals and arrearages, our A.B.C. report tells advertisers how much paid circulation we have, how it was obtained, how much readers pay for it, where it goes, the business or occupational analysis of subscribers and many other facts that buyers need in order to invest their advertising money most successfully.

## THE PAPER INDUSTRY AND PAPER WORLD

*Member of the Audit Bureau of Circulations* ABC *Ask for a copy of our latest A. B. C. report*

**A. B. C. = AUDIT BUREAU OF CIRCULATIONS = FACTS AS A MEASURE OF CIRCULATION VALUES**

# Drafted!

# PAPER . . .

Never before in the history of paper making has it been so essential that the maintenance programs of all paper mills be faithfully and rigidly carried out.

To this end, Bagley and Sewall is ready and willing to cooperate with paper mills in an intelligent effort to eliminate breakdowns and the resultant loss in production.

---

*The Bagley & Sewall Company - Watertown, N. Y.*

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

# HE-MAN VALVES

## . . . REMOTELY AND AUTOMATICALLY CONTROLLED

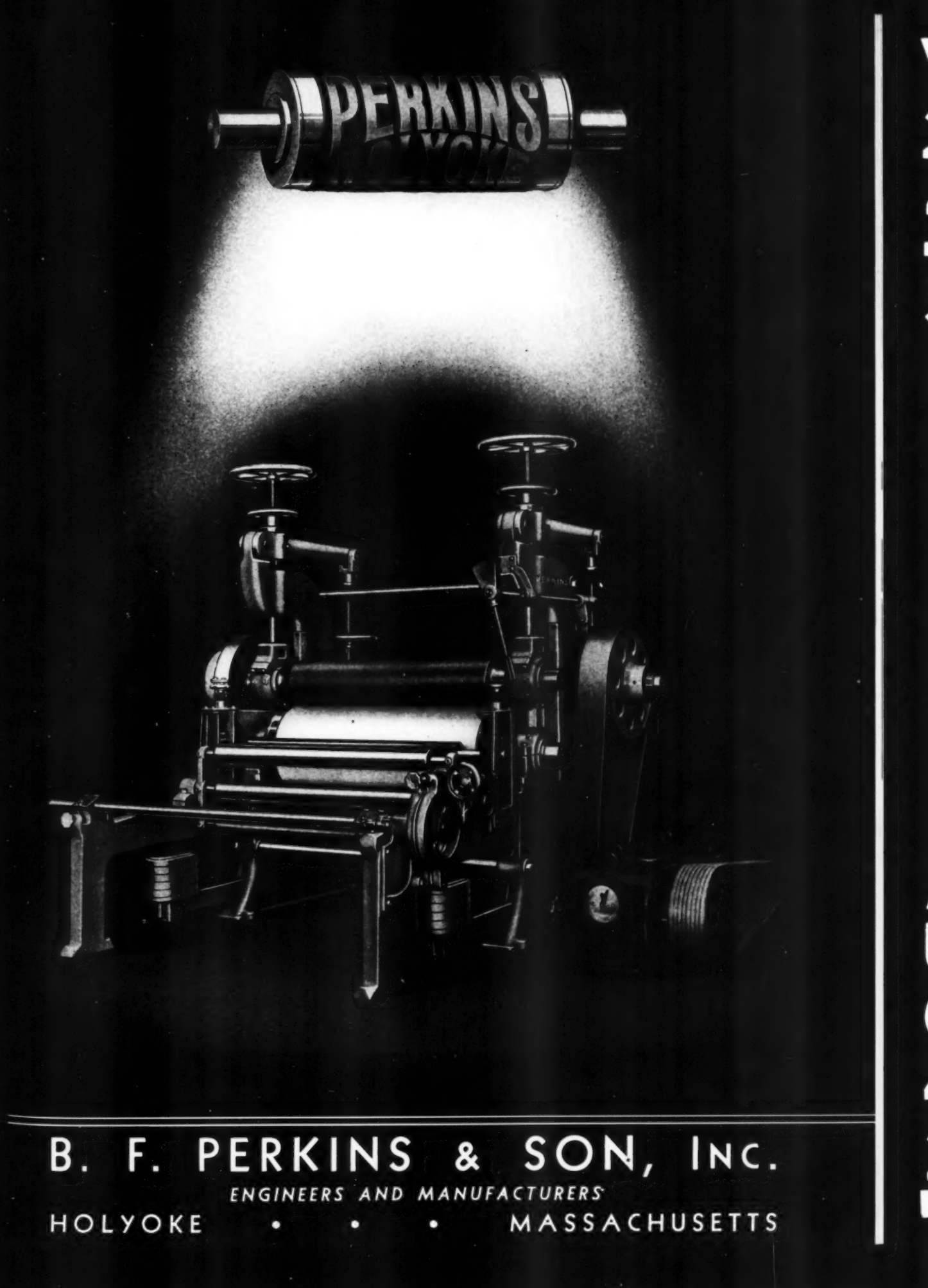
You don't see valves like these big 24" Miamis every day.

They're **big** . . . each designed to handle 8460 gallons at 6 ft. per second. Through them is "cycled" upwards of 100 tons of kraft stock each 24 hrs.

They're **easy to operate** . . . even though controlling such a flow is no ordinary job. They are all on one system and remotely controlled. Furthermore, operation is automatic with amount of cycling needed predetermined.

Maybe you never used such big valves due to the difficulty of opening and closing the older types. These Miami valves, however, were installed **after** a trial valve had met every test. That's because we know big valves . . . know how to make them operate smoothly. **Shartle Brothers, Middletown, Ohio. Division of the Black-Clawson Co.**

SHARTLE BROTHERS




# B. F. PERKINS & SON, INC.

*ENGINEERS AND MANUFACTURERS*

HOLYOKE • • • MASSACHUSETTS

# These MAKE MOTOR-DRIVE *MORE THAN* POWER!

• *Motor-drive provides within itself a means of*

| | |
|---|---|
| Speed Control | Reversing |
| Braking | Remote Control |
| Tandem Operation | Controlled Acceleration |
| Tension Control | Safety |

Slow Speeds for inching, threading, inspection

Applying them to boost production and improve quality APPLICATION ENGINEERING. That's our busine

In process just behind these windows are armature coils, field coils, stator coils, all in great variety—evidence that the Reliance Motors of which they will be a part are designed to perform many functions besides turning shafts and gears. Motors will fit the job. They are going to users who started their machine design and production plans with the question, *"What can we get the motor to do besides supply power?"* Help in answering this question can be given by Reliance men trained to think of motor-drive in terms of production. There's no obligation involved in asking us to sit in with you and talk it over.

**RELIANCE ELECTRIC & ENGINEERING COMPANY**

**1088 IVANHOE ROAD • • • CLEVELAND, OHIO**

BIRMINGHAM • BOSTON • BUFFALO • CHICAGO • CINCINNATI • DETROIT • GREENVILLE, S. C.
HOUSTON, TEXAS • LOS ANGELES • MINNEAPOLIS • NEW YORK • PHILADELPHIA • PITTSBURGH
PORTLAND, ORE. • ST. LOUIS • SAN FRANCISCO • SYRACUSE, N. Y. • AND OTHER PRINCIPAL CITIES

**RELIANCE A-C D-C MOTORS**

# Editorial

## The Plea of the Paper Industry

*I AM the paper industry—*
*The essential industry!*
*My products are the necessary concomitants of civilization;*
*They are found in expanding volume in every home in Christendom;*
*Every uncivilized home in the world is waiting for them;*
*My potential market is unlimited.*

*MINE is an inspiring industry—*
*A fundamental industry!*
*Back of it are the basic elements—*
*It has to do with sun and shadow, rain and snow,*
*Earth and sky and shrubs and trees;*
*Every plant that comes up from the soil contains my raw material;*
*The urge and the intrigue of the infinite are behind me.*

*I AM the paper industry—*
*The prophet of progress—the herald of evolution!*
*Noble men have labored for me;*
*History would die without me;*
*Poetry lives with me;*
*Art demands me.*
*Invention writhes upon my surface*
*And music is indelibly intimate with me.*
*But for me commerce must halt, finance cease and trade stop—*
*For processes depend upon me and progresses are made by me.*
*I alone measure the advance of civilization.*

*I AM the paper industry!*
*I have a glorious depth of background.*
*Consider it a moment with me—*
*From the dawn of civilization I have ministered to the*
*Unfolding needs of men as they stumbled on and up through*
*The ages; providing them always with the media by which*
*Their progresses were recorded; spreading before them the*
*Limitless sweep of past and present accomplishments, and*
*Now facilitating the processes by which they may gleam and*
*Grip the visions of the days to come—and go forward.*

*I AM the paper industry—*
*The potent industry!*
*The conquests of science were futile without me—*
*I am the handmaiden of every explorative thrust into the*
*Unknown hinterlands of race, space, tone and time.*
*To me is confided all that is known.*
*I cover and carry all that is grown.*
*The dreams dreamt by genius are whispered to me—*
*I guide and I vitalize all endeavor to be.*
*Behold! and see if there be any industry like unto me?*

*I AM the paper industry!*
*Since God gave me being, I've fought*
*Every fight against might—*
*But for me Magna Charta would be back in the night.*
*The pen more potent than the sword can be, only when*
*It's sheathed in me.*

*AND finally,*
*It is to thee—*
*Oh valiant men of my industry,*
*I address this pleading litany—*
*By all that I have been to thee;*
*By all that I was made to be;*
*By all that we have done to free*
*The world from ills of all degree;*
*Use me to save from tyranny*
*This blessed Land of Liberty.*

**At this time, when every commodity is being evaluated for its essentiality to the war program, we consider it not only a patriotic gesture, but timely, to reprint here "The Plea of the Paper Industry," which appeared in the April, 1931, issue of *The Paper Industry*. The "Plea" is reproduced as originally written, with the exception of the last two lines which have been re-written as of 1942.**

# Current Thought

## WHAT DOES "TOTAL WAR" MEAN TO YOU?

**WILLIAM SIBLEY**

▸▸▸ SEVERAL TIMES I have tried to convince the readers of this page that this war is going to be no Sunday school picnic. That is the text of this little article, and if you don't like to read disturbing news, you had better turn the page now and read some of the articles or advertisements which follow. Because what I have to say this month is the composite of better brains than I possess—and it isn't pretty reading. It isn't pretty thinking—but, it is time for pretty *serious* thinking.

From *Mein Kampf* down we have been assured that this is a "total war." Did you ever stop to realize that "total war" meant "totalitarian war"? And that the *Deutsche Wehr* on June 13, 1935, said: "In reality, totalitarian warfare is nothing but a gigantic struggle of elimination whose upshot will be terrible and irrevocable in its finality." . . . And the "Deutsche" don't fool. This *is* "total war"—and that means total effort, total sacrifice, total expenditure, total work, total production. If you don't know what that means, get this:

If you are still riding to work on your own rubber;

If you are still smoking (and giving away) cigarettes with abandon;

If you throw away rubber bands because they are too small for your package;

If you are still buying Martinis made with imported Vermouth;

If you are still *buying* Martinis and complaining about the domestic Vermouth;

If you are not devoting at least 15 per cent of your income to the purchase of War Bonds;

If you are not paying an income tax quadruple the present one (1941);

If you can still buy steaks, lamb chops, and vinegar without ration;

If you can still get two pounds of sugar per week; *you don't know what total war means.*

Listen: The Minister of Interior for Japan, told the people of Japan via radio on December 12, that "This will be a war of long duration. It will be a war of many years' effort. It will be a war perhaps extending to twenty years from now. But we will win in the end, and we shall be the masters of the entire world."

Six years ago, Japan invaded China unprovoked. . . . That's six years, remember? And ironically enough, China has suffered more defeats and setbacks since the United Nations united than she did prior thereto. Five years ago Mussolini asserted his right to dominate Abyssinia. That's five years—remember? It was during 1939 and 1940 that the Germans took over The Netherlands in four days; Belgium in eighteen days; France in thirty-nine days; Poland in eighteen days; Yugo-Slavia in twelve days; Greece in twenty-one days. Okay. How long before Russia, Australia, the Middle East, America?

It is time to think about home. It is time (long since) to forget about the doctrine that "it can't happen here" and ready ourselves for the time when it "does happen here." No fooling—I'm not trying to scare you. (Albeit, that might be a good idea.) One of the large steel corporations has made full and complete preparations for air raids on its Atlantic Coast and Midwest plants.

Yes, it's about time to think of home. It is about time you—the folks who read this article; the compositors who set the type; yes, and I, who wrote it—start in to defend America and the way of life to which we hope to become accustomed. Here are a few hints on what we can do:

1) Give your blood to the blood banks of the American Red Cross. It isn't a difficult or trying task—no pain. Merely a preliminary testing to determine type and purity, then a little rest on a cot while they take a pint of your blood. That pint of blood might very conceivably save the life of some mangled and fever-stricken American soldier.

2) Buy War Bonds; invest in America and your own future. It is going to take a lot of jack to win this war (500 billion or more, and I'm not fooling) and you had better start now to get the habit. If you don't help, it will be superimposed on you.

3) Give to all the worthy war-relief societies—and give until it hurts. The price of a pack of cigarettes means the equivalent of a Chinaman's life for three days (for the price of four drinks a Chinaman can live eighteen days). . . . And don't forget that the defeat of China means years of prolonged war for *us*.

4) Give to the U.S.O.—send food packages, cigarettes, books, magazines, candy to the men in service. This is a lonely war. Lonely because we have thinned our forces to a few in a bomber, a few in Lybia, a few in Australia, a few in Alaska, a few in Ireland, a few in the Navy.

5) Do Red Cross work. If you get in touch with your local Red Cross Chapter you will doubtless be amazed at the many things *you* can do (man or woman) for that wonderful organization. . . . And *not* for the Red Cross, but for our friends and neighbors in the service.

6) Conserve. Save your rubber, your electrical appliances, your oil, bones, and soap, your steel and brass scrap. There's coming a time when you will be urged to save your milk chocolate for the children. You'll be told *how* to use a piece of soap. Start now, on the path of conservation by saving tools, dies, reamers, wrenches, wire rope, hoists, beater blades, bearings, belting.

And do it *now*. Because from multiple sources (more informed than either you or I) have come the assurance that 1942 is the year of decision in Europe—and Europe is our first enemy. We can take care of Japan later, when she has only the Pacific from which to fight. . . . But will the war wait for us and our production? For *us*, stalemate means defeat, for we shall have failed to accomplish that which we set out to do. A Hitlerized Europe, a Tojo-ized Pacific can only mean endless, and more costly warfare. You had better start *now*, doing your part, and think in terms of a three- five- or seven-year war. (And it wouldn't be a bad idea to tear out this page and thumb tack it on the bulletin board.)

What Happens When a V-Belt Bends

FIG. 1

FIG. 2

# Here is Simple PROOF *of a* REAL SAVING in BELTS, in RUBBER, in POWER

In two minutes you can prove for yourself a simple fact that will lengthen belt wear and reduce operating costs.

Pick up any V-belt. Bend it as it bends when it goes around its pulley. As the belt bends, grip the sidewalls with your fingers. You will feel the *sides* of the belt *change shape.* If the belt has *straight* sides, the bending will force those sides to bulge out—as shown in Figure 1 (on the left).

Now make this same test with a belt that is built with the patented Concave side. Again you will feel the sides change shape but with this *important difference:*—the Concave side becomes perfectly straight. This belt, when bent, takes a shape that exactly fits its sheave groove. (See Figure 2).

Here are the savings. First—no out-bulge of the sides means uniform sidewall wear—a saving in belts for you, a saving in rubber for the Nation. Second—the full side of the belt uniformly grips the sheave wall. This means heavier loads without slippage—a saving in belt wear and also in power!

Only belts built by Gates are built with the Concave side, a Gates patent.

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**San Francisco, Cal.** 2700 16th Street

# ★ ★ ★ NOTES ON CONSERVATION OF CRITICAL MATERIALS ★ ★ ★

In our common all-out effort for Victory, every pound of critical materials must be made to serve to the last ounce. Such materials include Monel, Nickel, Inconel, bronze, copper and other corrosion-resisting metals.

Proper maintenance of equipment built from these metals will prolong their life. Two points to watch are (1) methods and solutions used for *cleaning*, and (2) when substitutions must be made be careful of the *combinations* in which alloys and metals are employed.

Suggestions regarding correct procedure are given below. For further information, and assistance on specific fabricating and other problems write to:

**THE INTERNATIONAL NICKEL COMPANY, INC.**
**67 Wall Street** **New York, N. Y.**

## USES OF CLEANING AND SOURING SOLUTIONS

A frequent cause of unnecessary corrosion in equipment is *improper mixing and use of acid-cleaning solutions.* This can be minimized by observation of the following rules:

### *DO...*

1. Use cold dilute sulfuric acid-concentrations not over 10%.
2. Use cold dilute hydrochloric acid (muriatic acid) concentration not over 5%.
3. Dilute acids in separate containers—always add the acid to water.
4. Use fresh solutions for each new cleaning operation.
5. Flush equipment thoroughly with cold, fresh water after cleaning or souring.

### *DON'T...*

1. Never use concentrated acid direct on equipment.
2. Never use *nitric* acid or *chlorine* solutions on Monel, Bronze, Brass, Copper or Iron equipment.
3. Never exceed the concentration or mixing ratio prescribed for the cleaning operation.
4. Do not allow the acid to remain on equipment longer than necessary for the cleaning purpose.
5. Do not use steam directly after acid application. Temperature increases corrosion. Wash first and then use steam if you must.

## PERMISSIBLE METAL COMBINATIONS

Where corrosion is a factor, metals of greatly differing composition should *not* be placed in contact with each other without regard to their electrolytic behavior. In using substitute materials, the following rules should be observed:

### *DO...*

1. Check carefully that substitute material has adequate corrosion resistance.
2. When using dissimilar metals together make certain they form a safe galvanic couple.
   (*a*) Under most conditions combinations of Monel, Bronze, Brass, and Copper are safe.
   (*b*) Usually small areas of Monel or Bronze may be combined with large areas of steel or cast iron, such as Monel bolts in steel machine rails or Monel pump shafts with iron or alloy iron impellers.

### *DON'T...*

1. Never combine metals or alloys whose composition and relative corrosion resistance are not known to you.
2. Do not combine large areas of Monel, Bronze, Brass or Copper with small areas of steel, such as steel rivets in Monel screen plates, or steel nails in Monel sheet.
3. Do not weld corrosion resisting alloys with welding rods other than recommended for their use.

*Technical information on galvanic corrosion available on request.*

## MACHINE SHOP PRACTICE applying to INCO Nickel Alloys

In spite of their high strength, ductility and toughness, Monel, Nickel and Inconel are readily machinable. Good results are obtained through use of correct tooling, speeds, feeds and cutting compounds, as follows:

***TOOLS***—Use high speed steel or super high speed steel cutting tools properly ground and keep cutting edge keen.

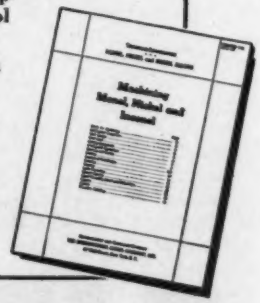
***SET UP***—Put work on sturdy machines and support tools rigidly in tool post. Set cutting tool in center line of work.

***LUBRICANT***—Keep work well flooded with sulfurized cutting compound.

***FEEDS and SPEEDS***—Follow feeds and speeds suggested in our Bulletin T-12.

***FINISH***—Have good finish on machine parts which are to withstand corrosive conditions.

*Bulletin T-12, "Machining Monel, Nickel and Inconel" available on request.*




"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

★ ★ ★ ★ ★ **INCO NICKEL ALLOYS** ★ ★ ★ ★ ★

**MONEL • "K" MONEL • "S" MONEL • "R" MONEL • "KR" MONEL • INCONEL • NICKEL • "Z" NICKEL**

***Sheet... Strip... Rod... Tubing... Wire... Castings***

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* Ryertex is made from a specially-developed textile material impregnated with synthetic resin and permanently molded under intense heat and tremendous pressure, producing a dense, strong, hard-surfaced bearing that has proven capable of withstanding very heavy continuous loads. It is manufactured exclusively for Joseph T. Ryerson & Son, Inc., by the Continental Diamond Fibre Co.

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## *Save Strategic Metals — Easy to Install*

Switch your machines to Ryertex Composition Bearings and forget bearing worries for the duration . . . and *after!*

It's *easier* to get Ryertex. *Smart engineering* to use this better bearing material. And *common sense* to avoid draining scarce stocks of brass, babbitt and bronze now that Ryertex is available. That's why many industries are quickly changing to this superior, non-metallic bearing.

Fortunately, Ryertex won its spurs as a superior bearing material years ago. Now, proof-tested and with enviable performance records, Ryertex is ready to go to work for you.

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Ryertex has a lower frictional coefficient than bronze or babbitt....

.....can carry greater loads—
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.....corrosion resistant—
.....lighter—
.....uses oil, grease or water lubrication—
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.....saves power, downtime, and results in a better product.

Send us your inquiry and specifications for prompt action.

Joseph T. Ryerson & Son, Inc., Chicago, Jersey City.

### PHYSICAL PROPERTIES

| | |
|---|---|
| Specific Gravity | 1.37 |
| Weight per Cu. In. Oz. | 0.8 |
| Modulus of Elasticity, psi | 1,500,000 |
| Tensile Strength with grain, psi | 9,400 |
| Tensile Strength across grain, psi | 7,000 |
| Compressive Strength, Flat, psi | 37,500 |
| Compressive Strength, Edge, psi | 25,000 |
| Bending Strength, psi | 18,000 |
| Water Absorption in 100 hrs. | 1.07% |
| Scleroscope Hardness | 75 |
| Max. Operating Temp. Deg. F. | 275 |
| Thermal Coeff. Expansion | 30 x $10^{-6}$ |
| Dry Coeff. of Friction | 0.280 |
| Permanent Set per 1" thickness under load of 1000 psi | .002 |

**RYERTEX** *non-Metallic* **BEARINGS**

# *What* Personnel Records *Reveal*

▸▸▸ INDUSTRIES ALL OVER THE COUNTRY have realized in the past few years the necessity for better employer-employee relationship within their organizations. Personnel officers have been selected and employed to assist in improving and maintaining this relationship. In most instances, the personnel departments probably have been organized as advisory and co-ordinating bodies to assist the line supervisors and foremen. These line supervisors and foremen are the key to any well-founded and successful employer-employee relationship program. To them must be delegated the direct responsibility for improving and maintaining the correct relationship in their daily contacts with the workmen under their jurisdiction.

The personnel officer is the direct representative of his plant manager or plant executive. In many cases, depending on the size of the organization, he will be delegated for many of the functions and responsibilities previously and normally carried by this top executive. In addition to this, the personnel officer must keep himself in an informed position on countless problems throughout the organization in order to be successful in acting as an advisor to his top executive in many of the major decisions he is called on to make.

In order to be of value and successful in the capacity described above, a personnel department must assemble and maintain in up-to-date order great stores of information and records pertaining to the various subjects on which they may be called for advice. Among this information will be found the company policies on the various problems that go to make up the daily life of any company such as labor agreements, insurance plans, hospital and medical aid plans, training programs, accident prevention programs, athletic programs, promotion plans and service award plans. Information on the many city, state and federal laws which affect the daily life of the organization must be maintained in a form that can be understood by those who are called upon to use or to pass on this information.

In addition, and without doubt the most useful of all the information which must be assembled and maintained, are the records on each individual on the company's payroll. These records should be maintained separately for each employee and should

**S. W. GRIMES**
**Personnel and Safety Sup.**
**Rayonier, Incorporated**
**(Port Angeles Division)**

be maintained in separate and locked files. Only those requiring this information in connection with their assigned duties should come in contact with any of these files and then only in the strictest confidence.

These records contain everything pertaining to the employee and his daily life at the plant, and in some cases in the community, if such information also affects his life at the plant. These records not only contain the employee's age, address, birthplace, citizenship, marital status, dependents, education, previous work history, personal description, physical condition, information on relatives, hobbies, military or naval service, home ownership, etc., but also contain everything of importance to the employment. They contain his rates of pay, promotions from one job to another, all suggestions made by the employee during his period of employment, accident and health record, record of absenteeism or tardiness, record of any serious reprimands or discipline for rule violations, records where exceptional skill or judgment was displayed by the employee, and records of participation in the various functions such as first aid training programs, safety committees, social committees, hospital committees, etc.

The status of each employee should be reviewed periodically on a progress form which should include the various factors important to his life at the plant. This progress report on each employee preferably should be made by two or more supervisors or foremen independently of each other. Thus the employee's progress can be measured from period to period and such help as necessary can be given him to strengthen any weak points indicated.

Such records are invaluable in making the countless decisions that plant executives, supervisors and foremen are called on to make each day in the performance of their duties in furthering our industrial progress. With such records, decisions relative to promotions from one position to another, retention of an employee's services, expenditures of money to correct hazards and improved working conditions, increases in pay and many others can be based on fact and merit rather than on opinions from memory which are often faulty.

Some employees and employee organizations occasionally frown on the assembling of such records. This thinking is generally the result of an ingrown suspicion of our industrial system, mostly fancied but partly the result of old abuses which are capitalized on by those using such psychology with the masses to gain or maintain

leadership. However, such suspicions are more often present when such programs are being inaugurated and can be dissipated only by building confidence throughout the employee group by conscientious and proper use of the records over a period of time.

Organizations that are rigidly policed by union committees are often faced with the reluctance of these committees to accept contrary decisions based on opinions of foremen and supervisors from memory regardless of how well founded such opinions may be. The same committees often will accept the same decision when they understand the opinion is based on facts recorded over a period of years. As confidence in the use of such records grows, union representatives not only will tolerate and accept decisions so based, but will welcome the use of the records as a scientific and fair basis for moulding their own opinions and decisions on questions pertaining to their individual members.

Many of the benefits gained from personnel records are the results of uncovering weaknesses in management functions. Records often indicate a lack of proper supervision or instruction. They sometimes indicate improper selection and placement of workers. Accident and health records, when compiled and studied continually, indicate and result in the abolition of job hazards, in improved lighting and ventilation and in many other improved conditions of direct benefit to both employee and employer.

Education and guidance of the supervisory staff is very necessary in obtaining the various records desired. Experience has indicated that while in most cases it is not difficult to get supervisors to turn in reports on rule violations, etc., much guidance and education is necessary to have the supervisors turn in reports on exceptional performances favorable to the employee. The natural inclination, and rightfully so, is to feel that a worker has been employed to perform his assignments in a correct manner using good judgment. Therefore, most supervisors take exceptional performance as a matter of course. However, if our records are to be accurate and fair, and if we expect our decisions based on these records to be sound, we must have complete records that indicate both the positive as well as the negative characteristics of each employee.

It has not been a great many years since many of our industrial units consisted of only eight or ten individuals. One of these was the employer, owner, president, superintendent, sales manager, and boss all in one and the other eight or nine were his employees. Very few written records were necessary under such circumstances. The employees knew all about the boss and his many problems and in turn the boss knew all about his employees—when they were in difficult financial circumstances; the state of their health and that of their families. He knew first hand, through his daily contacts with them, everything we today are attempting to know through personnel records, plus a lot more. Through such knowledge he was able to make decisions that were just and fair. His decisions were accepted by his employees in the same light because they knew they were based on well founded knowledge of day to day facts with which they were all acquainted. There was no suspicion or division between labor and capital to the extent that it exists today because the size of the unit permitted each individual to be a living personality rather than a cog in a wheel. He knew the personal business of all his fellow workers including the owner-boss and in turn his own personal business was known by the others.

The modern trend toward keeping personnel records is one attempt to again establish that old understand ing in our modern industrial unit. Decisions well founded on facts can thus be better understood and justified and at least some of the suspicion and mistrust that exists can be dissipated.

Therefore, the ideal personnel records will reveal two classes of facts. The first will be those which are required for routine or mechanical purposes; identification, occupation, time, pay and similar items. The second will be those which contribute to the creation of understanding of the employee as a fellow human being. And for the long view, personnel officers will contribute most by concentrating on this second value of their personnel records.

---

# LUMINESCENCE AS APPLIED TO BLACK-OUT PROBLEMS

▶▶▶ A broad study of the importance of the use of luminescence in its application to war and black-out problems is being carried forward at the Calço Division, American Cyanamid Company, Bound Brook, New Jersey.

Recently, during an interview, H. E. Millson and C. C. Candee of the Calco staff made the statement that there are three distinct classifications in the luminescent field.

1) *Radio Activity* is a phenomenon which is inherent in certain matters.

2) *Phosphorescence* is a property which can be applied to some substances and gives them the ability to glow in the dark after exposure to sunlight, ultraviolet light, or incandescent light.

3) *Fluorescence* is a property which can be applied to practically any material by painting, coating or dyeing, and requires a source of ultra-violet light in order to activate it. Fluorescent materials do not have a useful after-glow.

Where it is possible to expose the "marked" subject to sunlight or other types of natural illumination, it has been found that phosphorescent coatings have a wide application such as marking field or other equipment, which must be handled or assembled under black-out conditions.

While many people have been under the impression that fluorescence is less handy to use than other forms of luminescence, it is interesting to note that many forms of activating lamps are now available, which require as little as 2½ volts to operate and will show objects within a working radius.

A danger, however, not generally realized is that a mass of areas of luminescence have high visibility, the same as does ordinary light, and caution should be exercised in using large quantities of these materials out-of-doors. However, even this disadvantage can be capitalized as it is possible to paint the interior of a room with phosphorescent paint and in case of failure of power sources sufficient light will be available therefrom to carry on ordinary activities. Fluorescent tapes can also be prepared from wool, rayon, nylon, cotton, acetate or other textile fibers for use in outlining doorways, entrances, etc., during black-outs. These can be activated by a minimum of black light, for example, by the use of a 2½ watt Argon bulb in any ordinary 110 volt socket. Special ultraviolet hand lamps and 6 volt storage battery lamps are available for activating fluorescent objects, either during power failures or in places where normal power facilities are not available.

# SELECTION INSTALLATION MAINTENANCE } of CONTROL EQUIPMENT

**E. H. ALEXANDER, Engineer**
**Industrial Control Division**
**General Electric Company**

▸▸▸ ANY EQUIPMENT IN DAILY USE, and upon which industry depends for continuity of service, requires periodic inspection and maintenance. This is especially important when plants are running at peak capacity and when top production depends upon the continuous operation of each and every piece of equipment.

Electric control is no exception to this rule. After operating sometimes thousands of times a day, it is vitally important that controls be inspected regularly and that replacements or repairs be made quickly when necessary. Such inspection and maintenance pay big dividends by helping to keep up continuous production and by preventing costly shutdowns that waste the time of men and machines.

As in all operating equipment, prerequisites to any good maintenance program are the proper selection and installation of the equipment.

## SELECTION

The selection of electric control for a given application depends mainly upon the factors of available power, surrounding conditions, and starting conditions.

The points to be considered regarding available power are: whether alternating-current or direct-current power is used; if a-c., the number of phases; the voltage; the frequency; and whether a two-, three-, or four-wire system is to be used.

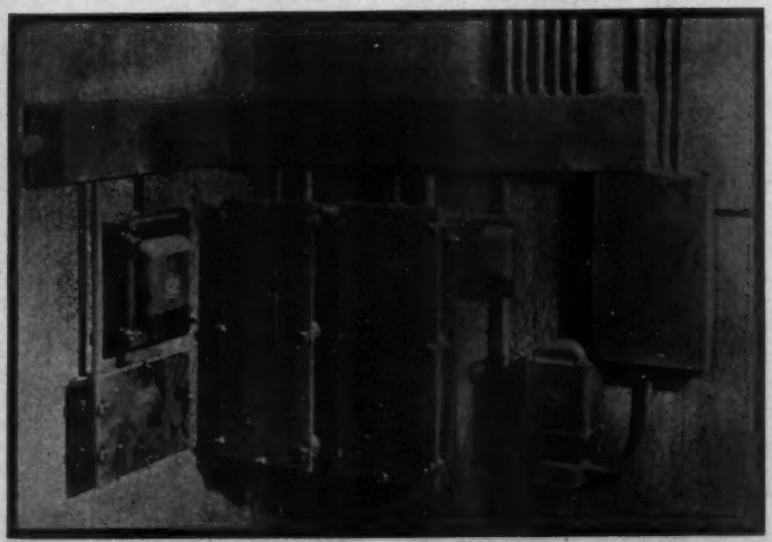
Complete information on any unusual service conditions should be sent to the manufacturer before selecting control equipment. The following is quoted from the NEMA Industrial Control Standards:

a) The use of apparatus in cooling mediums having temperature higher than 40 C. or at altitudes greater than 6000 feet should be considered as special applications.

b) There are further conditions which, where they exist, should be called to the manufacturer's attention. Apparatus for use in such cases may require special construction or protection. Among such unusual conditions are:

1) Exposure to damaging fumes
2) Operation in damp places
3) Exposure to excessive dust
4) Exposure to gritty or abrasive dust
5) Exposure to steam
6) Exposure to excessive oil vapor
7) Exposure to salt air
8) Exposure to vibration, shocks, and tilting
9) Exposure to explosive dust or gases
10) Exposure to the weather or dripping water

If control equipment is to be used under any of the above conditions, apply to the manufacturer for recommendations.



*The surrounding atmosphere determines to a great extent the proper type of enclosure to be used. These starters are protected against dust by special dust-tight enclosures.*

## INSTALLATION

After the proper control has been selected for the job, the next important step is to install it correctly and make necessary adjustments before putting it into service.

Unpack the equipment carefully as small parts may be thrown away with the packing material. Mount the panel vertically, so that the contactors will open by gravity when power is cut off. Panels should be mounted on a flat surface, and care should be taken not to twist the back when mounting. Copper grounding terminals are provided on open controllers for connecting ground wires to the apparatus. The conduit connection to the cases of enclosed controllers is considered sufficient grounding protection.

The sealing surface of the magnet frame and armature is spread with grease or oil to prevent rusting in shipment. The grease or oil should be removed when the contactor is put into service, but the surface should be wiped occasionally with a thin, rust-resisting oil. Before power is applied, each contactor and relay should be operated by hand to see that the moving parts operate freely and without binding. All electric interlocks should be clean and should make good contact when closed.

Resistor boxes should always be mounted with the grids in a vertical plane, and should be so located that free ventilation is permitted. To keep heating at a minimum, it is recommended that six-inch spacers be used between boxes when stacked, and that the stacks be 12 inches apart. Such an arrangement is desirable when continuous or heavy intermittent duty is expected, and essential when boxes are stacked over six high. Slow burning or noninflammable wire should be used in connecting to resistor terminals, to withstand the heat from the resistor.

### Adjustments

Contactors are designed to operate properly if the line voltage is within 85 to 110 per cent of the panel nameplate rating for a-c. circuits, and

*LEFT—Temperature overload relays are inspected before leaving the factory. If a relay does not function properly, it should be immersed in a pail of water kept at 90 C. (as shown above) and adjusted. RIGHT—Replacing a movable contact on a 2,300 volt motor control. Renewal parts should be kept handy at all times so that replacements can be made quickly.*

within 80 to 110 per cent for d-c. circuits. Wider ranges require special devices.

Where there is a continuous 10 per cent increase in voltage, suitable coils should be ordered, because, with this increase in voltage there is an approximate 50 per cent increase in wattage, which greatly increases the heating of the coil. While this will not cause immediate failure of the coil, the deterioration of the insulation is more rapid and the ultimate life of the coil is shortened. There is also an increase of 20 per cent in the pounding effect, resulting in a more rapid deformation of the armature, crystallization of the magnet parts, breaking of the contact tips, and increased noise.

The armatures should seal when the proper voltage is applied to the coils and should open by gravity when the power is cut off. All contact tips should, when closed, make line contact near the bottom of the face. On opening, the final break will be near the top. The rolling and wiping motions when closing and opening keep the contacts in good condition.

Electrical interlocks are adjusted at the factory to make contact at approximately the same time that the main contactor tips touch, or even a trifle later. For some special applications the interlocks may make contact before the main tips touch but, in general, the above instructions apply. To change the adjustment, loosen the nuts on the front and back of the base and screw the stud in or out to suit the conditions.

Mechanical interlocks are so adjusted that, with one contactor in the sealed (closed) position, there is a very small play on the other contactor. This play must not allow the moving contacts of the second contactor to touch the corresponding stationary tips when the tips of the first contactor are just touching.

## GENERAL PREVENTIVE MAINTENANCE

Now that the control device has been properly selected, installed, and adjusted, the maintenance program itself starts.

A first consideration in keeping control equipment in proper working condition is to prevent an accumulation of dirt, oil, grease or water on the operating parts of the control. It is, therefore, advisable to carry in stock protective paints for the stationary iron parts, and insulating varnish of the proper characteristics for the coils.

Where the air is saturated with moisture, or subject to the action of corrosive gases, it is well to inspect and paint the various control parts from two to four times a year, depending on the severity of the operation conditions.

It is often desirable to add heaters or lamps within the controller enclosure to prevent condensation of excessive moisture. For best results, such heaters should be energized continuously, especially when the controller is not being used.

Circuit breakers or contactors are usually of very rugged construction. Still, it is best to operate them by hand from time to time and check to make sure that all of the clearances are normal and that parts are working freely. Should parts become worn so that adjustments cannot be maintained, new parts should be used. Adjustment and cleaning, as well as renewal of the tips, is necessary and depends on the frequency of operation of each device. In the case of contactors, for example, the armature should be cleaned and checked for free working and the con dition of the magnet contact surfaces.

Occasional inspection should be made of all nuts and connection wires on panels and resistors, particularly when subject to vibration. Close inspection of pigtail connections should be made periodically since these are of finely woven wire for flexibility. In extremely corrosive atmospheres pigtail connections have been known to fall apart before there was any apparent indication of failure.

Float switches should be given the best of care, especially if they are of the moving contact type. The tips should be adjusted and lined up prop-

erly and, of course, cleaned if any indication of excessive corrosion is noted. The bearings should be made free to operate and any tendency towards binding should be corrected immediately.

In float switches of the mercury contact type, the mercury tubes should be held tightly in place, and if inspection shows that the tubes are becoming dark, it may be an indication of air leakage and the tubes should be renewed.

## TROUBLE SHOOTING

Troubles are bound to occur in the best of control equipment. Knowing what to do about them when they do occur will save much precious production time. If the fundamental cause of each trouble is understood the remedy will quite likely be apparent, and ways will be found to lessen the resultant trouble.

### Contactors

A contactor has several bolted or spring-closed contacts. Excessively high resistance at these contacts is the cause of the very high temperatures, such as 100 to 200 C., that may be reached when the contactor is carrying rated current or less. The most likely point of high resistance is at the contact where the movable tip makes contact with the stationary tips.

However, high resistance may occur at any of the several bolted joints on the contactor. Therefore, if one of these devices begins to develop an excessive temperature, a millivoltmeter should be used to determine which of the several joints has a high-voltage drop across it. An a-c. millivoltmeter is now available that can be used for checking the voltage drop on a-c. contactors.

When the copper contact or contacts that have excessive drop across them have been located, correction can be made by opening the contact and removing the oxide with a file (not with sandpaper or carborundum paper). It is unusual to find a high resistance in a bolted joint unless the contactor has previously reached very excessive temperatures. However, when excessive resistances are found in joints the cause should be removed.

Since high resistance will most commonly be found in the active contact, it is a very simple matter to inspect these tips weekly or monthly. If the temperature is unduly high, the tips should be given a few strokes with a file.

The foregoing comments apply particularly to copper contacts because they oxidize readily, and the copper oxide formed has a very high resistance. A file will remove the oxide and reduce the resistance to a low value again. Depending on various conditions, it may take a short or long time for the formation of sufficient oxide to cause excessive heating under ordinary types of service.

However, if sulphur gas is present, a high-resistance film will develop quite rapidly. To prevent this action, the contactor should be mounted in a tightly gasketed enclosing case, or immersed in oil.

Sometimes it is not practicable to keep the resistance of contacts low by filing them. When it is desired or necessary to maintain a low resistance of the active contact without servicing, a silver face can be brazed to the two tips so that the contact is made through that metal. Silver will oxidize and the oxide has a higher resistance than the pure metal, but when heated, silver oxide has the unusual property of reverting back to the metallic form. Therefore, silver contacts are self-purifying.

Electrical interlocks may fail to make circuit because of oxidation where copper contacts are used. Sometimes such failure occurs because dirt gets between the contacts. By using one hemispherical and one flat tip made of silver, both of these troubles will be overcome. The point of the hemispherical tip will make contact without trapping dirt particles between it and the flat tip, and the use of silver will overcome the oxide trouble occasioned by oxidation when copper contacts are used.

### For Severe Service

Excessive wear on the contact tips of a contactor indicates that it is operated frequently. For conditions of this kind, silver should not be used for the contacts, because it does not have the ability to stand up under this severe service as well as copper.

If the service is unusually heavy, and if the root-mean-square of the current is not more than equivalent to three-fourths of the contactor's rating, the tip can be faced with a certain alloy that will last several times longer than copper tips. The cost of this material is quite high, but its use is sometimes warranted.

### Let Contact Tips Stay Rough

Some maintenance men have the erroneous impression that contact tips that have been roughened by service should be kept smoothed up so that they will carry the load. A roughened tip will carry current just as well as a smooth tip.

Of course if a large projection should appear on a tip because of unusual arcing it should be removed. However, a tip that has been roughened by ordinary arcing need not be serviced. If a copper tip becomes overheated, this condition indicates that oxide has developed and should be removed.

A large percentage of contactor coil troubles can be traced back to heating. Therefore, if the temperature can be reduced coil troubles can be greatly decreased. Since the heating of a d-c. coil will vary as the square of the voltage, and the heating of an a-c. coil will vary about as the cube of the voltage, it follows that coils should be wound for the voltage that exists on the line. If the ambient temperature is high, this precaution is all the more important.

### Preventing Coil Burnouts

When an a-c. magnet, such as a solenoid, is supplied with constant-voltage excitation it requires a large inrush of current to close the armature. When the armature closes the coil current drops to a normal value. Sometimes armatures may not close because of excess friction or for some other reason and the large inrush current may burn out the coil within a few seconds.

Such mishaps can be prevented by the use of a thermal cutout to protect the coils. When the thermal cutout opens because the armature fails to close, it is merely necessary to replace a small link made of two pieces of metal held together by a low-melting-point solder.

### Resistors

Resistors are important auxiliaries and are encountered in many types, such as porcelain-tube, enameled resistors, open-wound, wire resistors, strip-wound, cast-grid, etc. Some types are more likely to develop certain kinds of trouble than others.

Cast grids are usually assembled and held together by being clamped on a tie rod. The current passes from one grid unit to another across a ground face. When too much current, say several hundred amperes, is made to flow across these ground surfaces, they may develop high resistance and destroy the joint.

To overcome this difficulty, these joints should be cleaned and the current path paralleled. This procedure will reduce the current in the middle joints, where the trouble usually occurs or is most likely to develop.

Edge-wound or strip resistors usually have their terminals either brazed or welded to the strip, which prevents excess resistance from developing at this joint. In order to provide an adjustable contact on this type of resistor, a clamp type of terminal is sometimes furnished. However, since

*Panels should be mounted vertically, so that the contactors will open by gravity when power is cut off. They should also be mounted on a flat surface and in a clean, dry spot if possible.*

the resistor may become quite hot at this point, a bad contact is very likely to develop. Therefore, if one does develop, the best cure is to braze the terminal at the proper position.

The high-resistance cast grids that have a small cross-sectional area sometimes give trouble because of breaking, especially if they are mounted on machines that vibrate severely. The best correction for this trouble is to use an edge-wound resistor, which is nonbreakable. This type is made of corrison-resisting material that is capable of withstanding very high temperatures without scaling.

### Relays

To cover all the relays used would be an endless task because there are many varieties of them. A number of relays have been designed to operate as a function of time. The one that was designed first to operate on a time basis was the dashpot type. Movement of a solenoid is retarded by means of a dashpot, giving a time-current relation that is called an inverse-time characteristic.

The kind of trouble that is inherent in a dashpot was the primary reason for the development of the other types of timing relays. A dashpot is essentially a close-fitting device that is easily affected by dirt, gumming of the oil, and corrosion of the close-fitting parts. Also the torque of the magnets varies with the position of the solenoid armature in its coil.

If trouble is experienced due to tripping while starting a motor or shortly after getting up to speed, there are three things that can be done.

1) A heavier oil may be used if the relay almost holds.

2) A starting contactor can be used that does not include the overload relay in the circuit. After the motor is up to speed, the running contactor can close and the starting contactor can open, connecting the overload relay into the circuit. This is a rather complicated method, but it is sometimes used.

3) The final alternative is to replace the dashpot with a temperature type of overload relay. This is one of the reasons why the temperature-type overload relays were originally developed.

### Temperature Overload Relay

Since the function of a temperature overload relay is to protect a motor under all ambient temperatures, its final temperature should be the same as that of the motor—which is 90 C. This means that a motor can have a 50 C. rise in a 40 C. ambient.

Therefore, the relay should just trip if placed in a 90 C. ambient, or in a pail of water held at that temperature. If a relay does not function correctly, it should be immersed in a pail of water kept at 90 C. and adjusted so that it will. The adjustment should not be made by bending the thermoflex strip. If this method of checking or adjustment does not provide the necessary degree of protection to the motor, it can be assumed that the size of the relay heater is not correct.

A temperature overload relay does not need any such maintenance attention as outlined for dashpots, but its use does involve the observation of certain precautions. Since it is sensitive to temperature, it should not be put in a strong draft, such as that from a window or a circulating fan. If it is necessary to place it in such a position, it should be shielded by a cover.

Conversely, a temperature overload relay should not be located above a source of heat, such as steam pipes. In brief, the relay should be in an ambient temperature that does not differ greatly from that of the motor.

### Time Delay Relay

The third type of relay is used for controlling the rate of acceleration of motors and for many other functions where a short-time-delay is needed. In the escapement type of relay, a pendulum is used as the governing means, which makes it necessary to mount the relay in a definite position with respect to the motion of the pendulum.

It is not always possible, however, to mount the relay in the proper position, and when it is in the out-of-true position is is less dependable. Shortening the pendulum makes it possible to tip the relay further from the vertical, but the shorter pendulum results in a shorter time delay.

To overcome this limitation a new design that has a balanced pendulum has been made available. The variation in time is obtained by changing the length of the stroke. In principle the two devices are the same, but mechanically they are quite different.

If the old-type escapements fail to time properly, their mounting position should be checked. However, if the application is such that it is difficult to mount and keep the relay in the proper position, use of the balanced type should be considered.

### When Corrosive Gases Are Around

Corrosive fumes in many plants, such as those manufacturing rayon, coke, sulphuric acid, nitric acid, chlorine, and so on, rapidly attack the metal parts of control devices and render them inoperative.

To overcome this trouble all the

*(Concluded on page 505)*

# Classification and Properties of Dyestuffs and Pigments

**E. R. LAUGHLIN, Technical Laboratory**
**E. I. du Pont de Nemours & Company, Inc.**

▸▸▸ THE OBJECT OF CLASSIFICATION is to simplify comprehension through emphasis on common characteristics.

When a number of more or less heterogeneous items are under consideration, a number of different bases of comparison are frequently possible. This situation is particularly true of dyestuffs. However, the definition of a dyestuff is of some assistance in classification because a compound to be so classed must fulfill two requirements: (1) it must be highly colored and (2) it must be capable of imparting color to something else.

Such a definition immediately suggests two criteria by which a dyestuff may be judged. One relates to the reason for the dyestuff being colored; the other to the manner in which it imparts color to other materials. The first is purely chemical, while the latter has to do with physical as well as chemical properties.

A great many dyestuffs (briefly considering them from the chemical standpoint) are not especially complicated compounds. They are formed as the result of a simple reaction between two or more familiar products. Some require a number of reactions for their formation. Others are intricate heterocyclic or polynuclear phenomena which probably amazed even the highly imaginative chemists responsible for their synthesis. A few are so extraordinarily complex that their structure is purely conjectural. Nevertheless, each dyestuff owes the existence of its color to the presence within the molecule of a certain arrangement of atoms which for the purpose of this presentation will be designated as the color nucleus. Disruption of this nucleus or disturbance of the linkages between its atoms results in destruction of the color. It follows, therefore, that the behavior of a dyestuff to certain destructive influences (such as light, oxidizing or reducing agents, for example) is at least partly a function of the ease with which its color nucleus is affected.

Attached to the color nucleus, however, are a number of other atoms or groups of atoms which though not essential to the existence of color, may add or detract from the color intensity, alter the hue or the degree of solubility in various solvents. There are also groups which determine the acid or basic character of the molecule and hence are responsible to a large measure for the dyeing properties. These latter groups are generally referred to as salt-forming.

Every dyestuff, therefore, may be considered one of a group of compounds classified either according to color nuclei or according to dyeing characteristics. Other members of the group may be expected to be capable of analogous reactions and properties. If the characteristics of one member are known, it is possible, with certain reservations which come only through experience, to infer the properties of the other members of the same group.

Actually over twenty fundamentally different color nuclei are recognized and there are at least a dozen fundamentally different ways in which dyeing may be accomplished as well as a number of variations. In the past, a great deal of emphasis has been placed upon classification of the dyestuffs used by the paper industry according to dyeing classes. Very little consideration has been given to classification according to color nuclei.

The familiar terms *acid, basic, direct* or *pigment* refer to the four most extensively used types of paper colors when classified according to dyeing characteristics. This classification seems in a large measure to satisfy the curiosity of the average person because it designates whether a given dye will suitably impart color in any given application procedure. The question invariably arises, however, as to why some colors are so totally different in many of their properties from others of the same dyeing class. As a partial answer to questions of this nature it is the author's intention to classify dyes (1) according to dyeing characteristics and (2) according to color nuclei so that a greater degree of generalization may be obtained. This procedure is admittedly not to be considered a panacea for all dyestuff problems nor is it an explanation of all dyeing peculiarities and fastness properties. However, a shift in the point of view generally leads to a more consummate understanding and the inclusion of the auxiliary classification according to color nuclei is made to permit a greater degree of understanding of many of the properties of dyestuffs and pigments.

There are approximately forty different coloring materials consumed by the United States paper industry, each to the extent of 100,000 pounds or more annually. There are fifteen more used in quantities from 25,000 to 100,000 pounds; there are twenty-five others, the use of which exceeds 10,000 pounds; and there are at least eighty others which have been in regular commercial use by the paper industry in smaller amounts during recent years.

This number of products in excess of one hundred and sixty refers to chemical individuals and not to instances where the same items are furnished in more than one concentration or where various suppliers offer the same product under different names.

Of these one hundred and sixty coloring materials 12 per cent are basic dyestuffs, 24 per cent acid dyestuffs, 33 per cent direct dyestuffs, and 17 per cent pigment colors; the remaining 14 per cent being distributed among the less frequently used dyeing classes, such as sulphur colors and the spirit soluble products employed in aniline printing.

Pigments are, of course, water insoluble. Acid, basic and direct colors have attached to the color molecule groups of atoms of a salt forming or solubilizing nature. These groups determine the acid or basic character of the color.

The author has often used the formation of common salt to illustrate the difference between acid and basic dyes:

Common salt, or sodium chloride, in chemical parlance, results from the reaction between a base, caustic soda, and an acid (hydrochloric acid):

| $NaOH$ | $+$ | $HCl$ | $\rightarrow$ | $NaCl$ | $+$ | $H_2O$ |
|---|---|---|---|---|---|---|
| caustic soda (sodium hydroxide) | | hydrochloric acid | | sodium chloride | | water |

Now one way of considering salt is as the sodium salt of hydrochloric acid.

There are many sodium salts of other acids, such as the sodium salt of sulphuric acid which is Glauber's salt; the sodium salt of nitric acid, sodium nitrate; the sodium salt of boric acid, borax, etc. The sodium salts of fatty acids like stearic and oleic acids are the common soaps in use every day. The sodium salts of color acids or dye acids are called acid dyes. Sometimes they are called direct dyes, as will be explained later, but all acid and direct colors are salts of color acids. Almost without exception they are sodium salts of color sulphonic acids.

To return to common salt again, it may also be considered as the chloride of a base (caustic soda). There are many other chloride salts of other bases, such as calcium chloride formed from hydrochloric acid and the base, lime; or ammonium chloride, which results from the base, ammonia. The salts which are formed from dye bases are called basic dyes. They are generally chlorides formed from dye bases and hydrochloric acid, but other acids are sometimes used, such as sulphuric or oxalic.

Thus, if in the formation of salt, NaCl, a dye base had been used instead of the caustic soda base, the result would have been a basic dye which can be pictured as Dye-Cl.

Conversely, if a dye acid had been used instead of hydrochloric acid, the result would have been an acid or direct dye which may be pictured as Na-Dye.

The reason for distinguishing between acid and direct dyes is because of their affinity for or ability to dye certain fibers. In the thirty years after Perkin's discovery of Mauve in 1856, an amazing number of dyestuffs was synthesized as the new industry grew by leaps and bounds. But all of the soluble salts of dye acids had no affinity for cotton and were of value primarily for the dyeing of animal fibers, such as wool and silk, to which they are substantive, especially from a dilute acetic or sulphuric acid bath.

In 1884, however, Bottiger discovered Congo Red which was the first salt of a dye acid to possess direct affinity for vegetable fibers. This discovery revolutionized the cotton dyeing industry; and such a vast number of other direct dyestuffs have been synthesized from analogous intermediates that today their number far surpasses that of any other class of dyes.

The direct colors dye animal fibers in much the same fashion as acid colors but the direct colors are substantive to cellulose while the acid colors are not. Since both are for the most part sodium salts of dye sulphonic acids, the line of demarcation is not always sharp and there are a few borderline colors which have varying degrees of affinity for cellulose but which have been classed as acid or direct depending upon which group they more closely resemble.

For the paper industry, the distinction between acid and direct colors is much the same, only here the criterion of being substantive to cellulose is expressed a little differently. It is expressed as the ability to beater dye a waterleaf furnish. All of the direct colors will perform this requirement to a reasonable extent. Sometimes they are assisted by the use of common salt or the beaters are heated. Alum, however, is of greater assistance and is generally required for efficient dyeing. *Both size and alum, however, are not essential to the retention of direct colors in the beater.*

In the case of acid colors, no amount of salt or heat will improve their retention. Alum without size causes a little more of the color to be held; but, except for one or two borderline colors, they cannot be efficiently applied in this fashion. *Both size and alum are essential to the retention of acid colors in the beater.*

## BASIC DYES

Mauveine, the first commercial production of the Mauve which Perkin discovered in 1856, is a basic dye. Safranine and Fuchsine were developed three years later. Bismarck or Basic Brown appeared in 1863. Methyl Violet in 1866, Methylene Blue in 1876, Victoria or Malachite Green in 1877, and Auramine in 1883. Thus, the basic dyes are among the oldest synthetic colors known.

They were formerly used extensively for the dyeing of cotton for which they have little affinity unless there has been a prior application of a tannin mordant. This treatment is achieved by saturating the fiber with a solution of tannic acid, followed by immersion in a bath of tartar emetic (potassium antimony tartrate).

Today, the greatest use of basic dyes is in the paper industry. Large quantities of the blue and violet colors are also employed in the manufacture of typewriter ribbons, the coating of carbon paper and the preparation of printing and stamp pad inks.

As previously stated, basic colors are the salts of dye bases, and generally appear as the chloride, hydrochloride, sulphate or oxalate. They are characterized by high tinctorial value, low solubility in water, poor fastness to light, and by their ability to form compounds with tannins and with lignin. These characteristics account for their dyeing of tannin mordanted cotton and their pronounced affinity for highly lignified furnishes, particularly unbleached sulphite and unbleached kraft which are difficult to dye without graniting.

Further generalization can best be made after division according to color nuclei.

In the comments which follow, a number of references are made to the efficiency of dye retention with both size and alum, with alum alone, and with neither. In the coloring of waterleaf papers, inferences may be made as to which colors may be used, as well as to whether their efficiency will be impaired or improved by the use of alum.

When a dyestuff is listed in the *Colour Index*, the official C. I. Number precedes the common name of the dye under which it is offered to the trade. An attempt has been made to eliminate manufacturers' trade prefixes insofar as possible. Since it is difficult to include all names under which products are sold, greater emphasis has been placed on those used by the major suppliers to the paper industry.

### I—Azo Basic Dyes

20 Chrysoidine G, GN, Y
21 Chrysoidine R, RS
332 Basic Brown BR; Bismarck Brown R, RR
331 Basic Brown GXP; Bismarck Brown B, Y, TDR

These dyestuffs are characterized by their particularly poor affinity for cellulose. Their retention on full-bleached pulps without size or alum is very low. It is increased only slightly with alum and is still so low with both size and alum that the use of these colors is universally avoided except for semi-bleached or unbleached pulps. Their capacity for reaction with tannins and with lignin is fairly good, thus accounting for their efficient retention on furnishes comprised of groundwood, unbleached sulphite or unbleached kraft. However, the fact that more color is retained on unbleached pulps with size and alum than without it indicates the reaction with lignins is not so complete as with other basic colors which, except for the Rhodamines, are retained equally well on unbleached pulps regardless of whether they are dyed with alum alone, both size and alum, or with neither.

The solubility of the tannin complex in alcohol is relatively low as is the alcohol solubility of the colors themselves, particularly the browns.

The water solubility of the Basic or Bismarck Browns is only fair but it is nevertheless superior to that of the Chrysoidines. The latter are never

recommended for calender coloring and the former only rarely. Neither type really should be used because of the sensitivity of the color solution to heat. In beater dyeing, these colors are generally thrown in dry; but, when color solutions are to be made, it is well to keep the temperature below 140 Fahr. Under no circumstances should these colors be boiled or subjected to near-boiling temperatures.

Their affinity for clay is good but is less than that of the majority of basic colors.

## II—Azine, Oxazine and Thiazine Basic Colors

841 Safranine A, T Extra, GX, Y
922 Methylene Blue ZX, BX, 2B, A

The heterocyclic nucleus of this class contains nitrogen, nitrogen and oxygen, or nitrogen and sulphur; and the colors are accordingly named azine, oxazine or thiazine, respectively. Only two types are used by the paper industry to any appreciable extent—Safranine being azine and Methylene Blue, thiazine.

Water solubility of these two dyestuffs is fair but their alcohol solubility is noticeably lower than that of most other basic colors. In fact, Methylene Blue could scarcely be termed alcohol soluble. Water insoluble tannin and lignin complexes are readily formed which are of lower alcohol solubility than the corresponding complexes of most other basic colors. Under certain conditions, their affinity for pure cellulose is excellent but they exhibit a peculiarity best illustrated by making dyeings on any full-bleached pulp as follows:

A) Color, size, and alum
B) Color and alum
C) Color only

*C* is stronger than *A* or *B*, and represents almost complete dye retention in up to medium depth shades.

*B* is very weak. *A* is stronger than *B* and may be considered satisfactory retention for commercial purposes but it is noticeably weaker than *C*.

This behavior on full-bleached pulps is phenomenal and is exhibited only by one other class of colors (the Acridines) which is rarely applied to paper.

In unbleached pulps, their retention is typically basic; i.e., practically complete regardless of whether size and alum is used.

This class of colors also possesses excellent affinity for clay.

## III—Triphenyl Methane and Related Basic Colors

657 Victoria Green SC, WB; Malachite Green; Green MX
662 Brilliant Green Crystals, B, EN
682 Ethyl Violet
680 Methyl Violet Conc., XXA, 2B; Violet 3BPN
681 Crystal Violet Powder, AP, C, 6B; Paper Blue R Conc.
677 Fuchsine Conc.; Magenta, RTN
729 Victoria Blue B, BX, BS, BA
..... Victoria Pure Blue BO

This group constitutes the largest and most important group of basic colors and contains some of the most brilliant colors known. The nucleus is considered as being related to methane, $CH_4$, in which three of the hydrogen atoms have been replaced by derivatives of benzene, or benzene and naphthalene as in the case of the Victoria Blues which are, strictly speaking, diphenyl naphthyl methane colors.

All colors in the group possess a very high degree of solubility in the simpler aliphatic alcohols, particularly amyl alcohol. They react more readily with tannins and with lignin than any other class of basic colors; hence they show strong tendencies to produce graniting. Furthermore, their mordant complexes have the lowest water solubility. When dyed on unbleached pulps they produce shades faster to water bleeding than can be obtained with other basic dyes. On other furnishes greater improvement in fastness to water bleeding may be obtained by the use of tannic acid or similar mordants.

Also the alcohol solubility of the tannic acid complexes is quite high, a fact utilized in the preparation of spirit printing inks.

### Mechanism of Dyeing Basic Colors

On full-bleached furnishes, colors of this group are fairly well retained when sized, but the use of alum without size inhibits retention to a very great extent (from 70 to 90 per cent). In fact, the retention of nearly all basic colors on full bleached furnishes is greatly reduced by the use of alum without size. The probable explanation is that the basic colors are weakly positively charged and, without size or alum, are attracted to the negatively charged fiber to a greater or less extent depending upon the class. Alum, however, is readily hydrolyzed to the relatively strongly, positively charged alumina which, because it has a greater charge than the basic color, is more quickly attracted to the fiber, thus preventing the adsorption of the color.

These considerations are almost entirely overcome on lignified or unbleached furnishes by the reaction between the lignin and the basic color.[1] Consequently, with most basic colors (including members of the triphenyl methane class), size or alum has no effect on the virtually complete retention of the color on unbleached pulps.

The triphenyl methane colors, furthermore, have excellent affinity for clay, and, together with the azine class, are the best of the basic colors in this respect.

## IV—Ketonimine Basic Colors

655 Auramine

Because of the similarity of Auramine to diphenyl methane, it might be reasoned that an analogy exists between it and the triphenyl methane colors just discussed. There is little evidence for such an assumption because the properties of Auramine indicate it to be distinctly different.

First of all, it is readily hydrolyzed in aqueous solution. Since this is a time-temperature reaction, aqueous solutions of Auramine are not stable for very long periods of time even at room temperature. As the temperature increases, stability decreases slowly at first and then quite rapidly, especially at temperatures over 120 Fahr.

This dye is generally thrown in the beater dry. Where dissolved, attention should be given to the temperature which, if too high, will not permit realization of true color value.

Furthermore, Auramine has about the lowest cold water solubility of any basic colors used in paper. It is fairly soluble in warm water but any concentration above 0.4 per cent will precipitate out when cooled to room temperature.[2] This failing is, however, partially compensated for by the high tinctorial value of the color.

The mordant complexes formed are not completely water insoluble and tend to bleed somewhat; but the retention on full bleached furnishes, when sized, is probably better than that of any other basic paper colors. If, however, alum and no size is used on full-bleached pulps, the color is almost completely held off the fiber. Its retention on unbleached furnishes is practically complete and size and alum are without influence.

The affinity of Auramine for clay is good but less than that of the triphenyl methane and azine classes.

## V—Xanthene Basic Colors

749 Rhodamine B, B Extra
752 (or closely related) Rhodamine 5GDN, 6GDN, 6G

These colors are conceded to produce the most brilliant shades of pink

(1) Some work has been done which indicates that basic dye retention on pulps is proportionate to the lignin content as determined by permanganate number.

(2) This value refers to the use of the concentrated form of the dye and not to one of the reduced brands.

obtainable but they differ rather strikingly from other basic colors in a number of respects. In aqueous solutions, they show a strong fluorescence. They are especially soluble in alcohol, and their tannic acid complexes have extraordinary alcohol solubility, i.e., over 20 per cent.

Their reaction does not lead to the formation of completely water insoluble products. This is particularly true of Rhodamine B which contains a free carboxyl group—hence, the tendency of the Rhodamine mordant complexes to bleed somewhat in water.

Affinity for clay is fair, but less than that of other basic color classes.

Retention on sized, full-bleached furnishes is excellent. In fact, the Rhodamines are on a par with Auramine in being superior to all other basic colors in this respect. Furthermore, unless size and alum is used in dyeing full-bleached pulps, retention is very poor.

On unbleached pulps, complete color value is not obtained unless alum or size and alum are used.

The light fastness of these colors, while at best only moderate, is nevertheless superior to that of the average basic color. Another interesting property is their compatibility with most acid and direct colors in aqueous solution; a phenomenon enjoyed by no other class of basic dyes.

The extra concentrated brands of both Rhodamines are generally offered in the form of fine crystals containing no standardizing material and are as near 100 per cent chemical purity as any dyestuffs on the regular market.

### VI—Acridine Basic Colors

789 Phosphine G, GG

This class is of very little importance to the paper industry and is listed merely in the interest of accuracy because Phosphine G has been used to a limited extent for the surface coloring of paper. Other members of this class which includes Basic Orange 3RN or Acridine Orange, Phosphine N, etc., are used principally in the dyeing of leather.

For surface application to paper, these colors fill the need for basic oranges which do not possess the poor solubility and stability characteristics attendant to the Chrysoidines. They are rarely employed in beater dyeing yet they do possess remarkably good affinity for bleached pulps, particularly when no size or alum is used. Retention on unbleached furnishes is complete and uninfluenced by size and alum. Affinity for clay is quite high but less than that of most other basic color classes.

***EDITOR'S NOTE: This is Part I of Mr. Laughlin's article. Another installment will be published next month.***

# The Dollar Value of Higher Efficiencies

**W. F. SCHAPHORST, M. E.**

▶▶▶ THE ACCOMPANYING CHART will be found useful by plant executives, engineers, and mechanics, for determining the savings that are possible by increasing machine efficiencies. This may be accomplished in two ways: by removing the old machine and installing one having higher efficiency, or, by increasing the efficiency of the old machine, if possible.

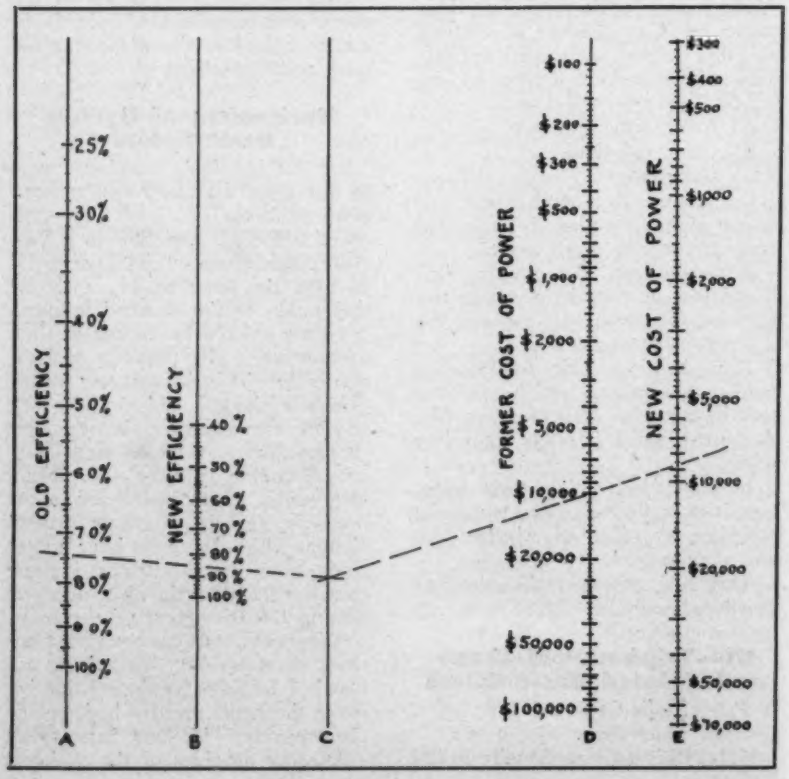
To use the chart, simply zig zag two straight lines across as indicated by the dotted lines and the saving is found by subtracting the figure in column E from that in column D.

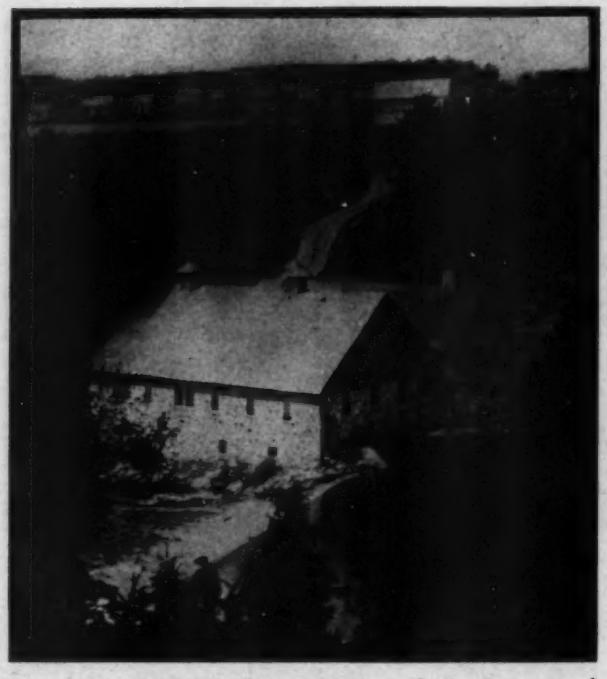
For example, suppose that a water pump has an efficiency of 74 per cent, that it is proposed to install a new or improved pump having an efficiency of 85 per cent, and that the cost of electric power at present is $10,000 per year. How much money will be saved by installing the pump having the higher efficiency?

The dotted lines show how it is done. Run a line through the 74 per cent, column A, and the 85 per cent, column B; and locate the intersection with column C. Then from that point of intersection run through the $10,000 in column D and it will be found that the line cuts column E at $8,700. This means that the new pump will operate at a cost of $8,700 per year for electric power as compared with the present cost of $10,000 per year.

There is no limit to the range of the chart as regards price or cost. For example, by simply adding ciphers to the figures in columns D and E, the same dotted line indicates that if the former cost is $100,000, the new cost will be $87,000—or, if the former cost is $1,000,000, the new cost will be $870,000. Where the costs are less, simply subtract ciphers. Thus, if the former cost is $10 per year, three ciphers are removed from the figure in column D and from the figure in column E, the answer being $8.70. In other words, add as many ciphers to the figure in column E as are added to the figure in column D, or, if deducting, subtract as many ciphers from the figure in column E as are deducted from the figure in column D.

The chart emphasizes the money value of higher efficiencies. First cost, as well as efficiency, of course, must be given consideration. Thus it may not pay to buy a pump having the highest possible efficiency, but it might pay well to install a standard pump of reasonable price having an efficiency higher than that of the old pump.





*The mill in which the author as a young man helped to make strawboard which was dried in the sun. Located at Portneuf, Quebec.*

# Reminiscences of an Old-Timer

**CYRUS FIELD LOGAN**

*Portrait of author taken about ten years ago.*

▸▸▸ MY FIRST CHILDHOOD RECOLLECTIONS go back to 1860-61. Then, as a boy, between two and three years of age, I remember my father taking me in his arms and carrying me through his rag paper mill at Portneuf, Quebec.

What seemed to impress me most was a large undershot water wheel. It had a shaft that extended from both sides and across the entire basement or lower floor of the mill. The wheel turned very slowly but everything connected to it turned so fast.

Only one end of the mill was used for making paper; the other end was used for making nails.

In the nail factory, men cut nails from strips of sheet iron. First, the iron strips were cut from large sheets, the widths of the strips governing the lengths of the nails. Then the strips were heated in a furnace fired with charcoal. Upon becoming red hot, they were removed from the furnace with tongs and fed into a cutting machine. After each cut, the individual strip was turned over and then back again, thus forming the head and sharp point to the nail.

To this day, in my mind, I can see the nails changing in color from red to a deep blue as they cooled off. Likewise, never do I see a modern water wheel but my mind goes back to the old undershot wheel in my father's mill.

Literally, having been born in a paper mill, I may say that my whole life has been spent in the industry.

As a youngster, I was always impressed with moving machinery. This fascination caused me to become familiar at an early age with all of the working parts of paper-mill machinery.

When I was between ten and twelve years of age, I became a helper on a paper machine. This machine had a deckle width of about 50 inches and was fitted with a first and second press, quite a number of 24-inch diameter dryers, one stack of calenders, a sheet cutter and a set of reels. Although designed to make straw wrapping paper, the machine was used during the summer to make heavy strawboard.

In the latter case, it was the practice to cut out the second press and all of the dry end of the machine, and to substitute a wood roll, grooved its entire length, for the top first press. A small bell was attached to the front housing of the press roll; and a small boss inserted in the protruding roll journal. The clapper of the bell was set to strike at each revolution of the press roll after the sheet had reached a certain thickness. When the bell sounded a certain number of times, the operator would remove the sheet from the roll by running a sharp wooden pin through the groove across the roll and transfer the wet sheet to a table.

The next operation was to take the wet sheets so prepared to a drying field nearby. Here they were spread out and allowed to dry in the sun.

To dry them properly, they had to be turned over at least once. After drying they were brought back to the mill where they were sprinkled with water, cockles straightened out, and made into piles. The piles were covered with wood frames and weighted down with stones or other heavy objects on hand.

After standing all night, the sheets from a pile were put through a sheet calender, sheet by sheet, the necessary number of times to make them smooth. They were then packed in bundles without trimming.

When a rain or wind storm came up suddenly during the drying period, all hands ran to the field, gathered up the sheets, and hurriedly put them in sheds located nearby. If the sheets had not been dried sufficiently at the time, they had to be put back on the field following the storm.

*The old Logan mill after considerable modernisation and enlargement. Located at Portneuf, Que., it was this mill that was visited by the author, when between two and three years old, in the company of his father.*

Straw, in those days, was cooked with steam in open tubs or tanks. Quick lime was the only cooking agent used.

Beating of the straw was done in Hollander type beaters. Jordans were not then in common use. Proper refinement of the stock had to be left to the judgment and skill of the beaterman.

Electric lights were unknown. Kerosene (or coal oil as it was known then) and tallow candles were used for lighting the mill. Glass or metal lamps with glass chimneys contained the kerosene; while perforated tin lanterns usually housed the candles.

Soda pulp came into quite general use in the early sixties. As a rule it was cooked in small-diameter digesters of the riveted type. These digesters were set in brick furnaces and were heated directly through their bottoms by wood fires. Blow-off pipes usually were made of heavy cast iron. They, too, were exposed to direct fire.

Within each digester, about 18 inches below the top, was a perforated screen plate. Cooking liquor was charged into the digester until the screen was just covered. Then the digester cover was put on, and the fire started.

Cooking pressure was brought up to 100-110 lb. Generally, the cooking time was eight to ten hours.

Each digester usually was connected to two blow pits, the second one being used only to catch such pulp as was carried over with the steam on its way to the open air.

The pulp was discharged from the blow pits to open vats with screen bottoms where it was freed of the spent liquor and washed clean. It was then removed from the vats by men with shovels to a platform. From the platform, it was shoveled into an agitator tank from which it was delivered to a screen and then to a wet machine.

The wet machine stock, removed by hand, was delivered to a Hollander type, cast-iron, bleaching beater. In those days, all of the pulp was bleached and usually used in the finer grades of paper.

The digesters, being set in brick settings, stayed hot after being discharged. In winter, when filling them with cold, icy chips, sudden shrinkage worked a hardship on the rivets and seams. Then, too, a heavy scale would form on the bottom crown sheets directly over the fires. Such digesters had to be repaired often.

On one cold day in February, 1878, one of these fire-heated digesters, located in a mill where I was employed, blew up.* The explosion killed two persons and injured ten others, some of them seriously.

The accident occurred just a little before 7 o'clock in the morning, just as my brother and I were nearing the mill on our way to work. Had we been at the mill ten minutes sooner, both of us might have been involved in the accident, since the men who were killed were our mates.

The day shift, in those days, worked from 7 A. M. to 6 P. M.; the night shift, from 6 P. M. to 7 A. M. The work-week was six days; Sunday, then, was a real rest day.

A long, single-tray, brick-lined furnace was used for black ash recovery. The furnace was about 6 ft. high, 5 ft. wide, and 75 ft. long. It had a firebox for cordwood at one end; a bridge wall at the end of the fire grates, and a tray that extended the full length of the furnace from about a foot below the top of the bridge wall. On top of the furnace, beginning at the bridge wall and extending across its entire width, was an arched bottom iron tank. This tank was about 3 ft. deep and 25 ft. long. It received the black liquor as it came from the wash pans. There it was kept boiling by the burning ash from below. The flame of the wood burning furnace, as it passed over the bridge wall, had a tendency to lap downward to the surface of the burning ash.

Small cast iron doors were located about 3 ft. apart on the working side

**EDITOR'S NOTE: Cyrus Field Logan, named after Cyrus Field, famed for the laying of the Atlantic cable, was born in 1858. For many years, he was known as "Circulator Logan," his original patent on digester circulators dating back to 1887. His career in the paper industry began when he was twelve years old, and includes the superintendency of a number of large mills in both eastern and western parts of the United States. Much of his work has been of a pioneering nature, and, for quite a number of years, he has been functioning as a consulting engineer.**

of the furnace. The bottoms of the doors were set a few inches above the liquor level. The inside of the furnace wall slanted down from the bottom of the doors to the bottom of the tray to facilitate the drawing out of the burned ash.

In the burning operation, a crust formed rather quickly on the surface of the liquor. This crust was kept broken up through the use of a long-handled paddle, the operator stirring it from time to time as the burning ash grew thicker. When a sufficient mass had accumulated in the tray, the incoming liquor from the tank above was shut off, and the ash in the tray fully burned. Then the operator with an iron hoe hauled out the red hot and, more or less, flaming ash. The piles of ash, which accumulated on the floor as a result of this operation, were left there to burn out and cool off.

In operating black ash furnaces of this kind, great care had to be taken in keeping the iron paddles and hoes hot, the paddles particularly. Just under the bridge wall, where the heat was greatest, the melting ash, if touched with a cold paddle, would explode as if it were dynamite. I remember one such explosion which split the furnace open from end to end and blew out the molten ash. The ash struck the operator full in the face and burned out both of his eyes. I was nearby at the time of the accident and, for that reason, I have never forgotten it.

*Logan Bank, the birthplace and early home of the author. Built about 1842 on a hill overlooking the mill, the house was made of logs, then lathed and plastered on the inside and sheathed over on the outside. It is still in very good condition.*

Compare this old style of recovery system with modern recovery equipment, then reflect on what the old-timer was up against. Yet, the cost of recovering 1,000 lb. of ash in 1869, according to records kept by an older brother, was $3.67.

A batch system was used for carrying out the causticizing operation, so that the cooled ash, after weighing, simply was delivered to causticizing tanks.

The same mill, in which the recovery system just described was installed, and also in which the digester explosion, previously mentioned, occurred, was equipped with two fourdrinier machines. One of these machines had a 60-inch trim; the other, 72-inch, a large and high speed machine for the time.

An older brother was machine tender of the larger machine. I was his backtender.

One day, on a light sheet, we made a record run of 150 feet per minute.

In those days, anyone claiming to be a papermaker, was asked to show his fingers. If he could exhibit one or more fingers that showed the result of being pinched in the calenders, he was recognized as telling the truth. I have that trade-mark.

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# PEST-RESISTANT PREPARATION FOR PAPER

▶▶▶ MANY ATTEMPTS HAVE BEEN MADE to treat paper and similar paper packaging products to render them resistant to destructive pests. A possible solution is suggested by a procedure developed by C. H. Hillen and patented in Australia (Australian Pat. 113,158). According to this patent, sheets of paper or cardboard are coated with a solution consisting of:

| | Per cent |
|---|---|
| Formalin | 5 |
| Glycerine | 5 |
| Ammonium hydroxide | 2 |
| Casein | 5 |
| Water | 83 |

In the process, several sheets of paper are put together, and in between is placed one sheet coated with the above solution to which some blue coloring matter has been added. The resultant laminated sheet is then coated on both sides with a somewhat similar solution consisting of:

| | Per cent |
|---|---|
| Formalin | 10 |
| Glycerine | 2 |
| Boric acid | 1 |
| Sulphuric acid | 1 |
| Water | 86 |

The paper products so treated may be manufactured into packing boxes, bags, wrappings and similar packaging products. (From *Glycerine Facts.*)

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# Selection-Installation-Maintenance of Control Equipment

*(Continued from page 498)*

operating parts are frequently immersed in oil in a container capable of withstanding the corrosive atmosphere. The container is made either of cast iron or of heavy boilerplate steel, which is given a protective coating of a paint that is capable of withstanding the fumes of gases encountered.

When it is impracticable to oil-immerse a given type of control, the equipment is enclosed in a heavy case with a tight, gasketed cover. The enclosing case is protected with a suitable corrosion-resisting paint.

## Know the Equipment

Control equipment can be quite simple or very complex, and the job of the maintenance man is easier if he has available instruction books and wiring diagrams covering every piece of control and every circuit for which he has responsibility. Extra coils and contact tips should be kept on hand as well as a complete list of spare parts. Maintenance is simplified considerably if the maintenance man makes a practice of becoming thoroughly familiar with the circuits and operation of each new controller as it is installed in the plant.

*The Finest*

**THAT SKILL AND EXPERIENCE CAN BUILD**

To our Railroads, America pays thankful tribute! They are doing a magnificent job in speeding troop and war material movement. Since pioneer days, our railroads have led the world in quality, efficiency and capacity. They are the finest that skill and experience can build.

But for these railroads—the shops that build locomotives, cars, rails and equipment, there had to be an abundance of water. With amazingly few exceptions, it was Layne who designed and built their Well Water Systems. Layne Wells and Pumps are famed for their high efficiency, long life and low upkeep cost.

Layne Well Water Systems, like our great American railroads are doing a magnificent job. They are standing up to unmerciful treatment—day after day and month after month of continuous full capacity operation. It is in this tragic period of emergency that Layne reliability, skillful design and rugged construction is most appreciated. Thousands of Layne Well Water Systems are serving railroads, factories, municipalities, irrigation projects and both the Army and Navy. For late catalogs, bulletins, folders, etc., address,

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International Water Supply, Ltd...London, Ont.

# ALLIED

## ACME STEEL GETS MINUTE MAN FLAG

Colorful ceremonies marked the presentation of the Minute Man Flag to the Archer Plant (Chicago) of the Acme Steel Company, Chicago.

During the noon-hour event, J. E. Ott, manager of the Archer Plant presided. Bobby Arnst, of musical comedy fame entertained. The presentation was made by J. C. Gallaher, First Deputy Administrator of the Illinois Savings Bond Staff of the Treasury Department. Chester M. MacChesney, first vice president of Acme, accepted the citation.

The flag was presented to the three employees whose percentages of payroll deduction for War Bonds are the

*A. C. MacChesney (left) first vice president of Acme Steel Co. accepts Minute Man citation from John C. Gallaher, first deputy administrator, Illinois War Savings Staff, U. S. Treasury. Looking on are John E. Ott (extreme right), Acme's Archer plant manager, and Leo Crown, French soldier, who recently escaped from German prison camp.*

*Alfred C. Sheehy, Deputy State Administrator of War Savings Staff for Massachusetts, presents Minute Man Flag and certificate to Irving W. Lane, veteran employee of The Foxboro Company.*

largest. Two of these, one a girl, are purchasing 26 and 23 per cent of their salary; the third buys 48 per cent.

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## HERCULES EXPANDS RESEARCH STAFF

Hercules Powder Company, Wilmington, Delaware, has employed a group of women chemists and also instituted a night research shift at its central Experiment Station laboratories in order to handle an expanded research program, 90 per cent devoted to the war effort. Dr. Emil Ott is director of the research staff, which includes more than 204 trained chemists and a total of more than 600 men and women working in the 15 buildings located on a 300-acre plot of land on the outskirts of Wilmington. Research expenditures at this Experiment Station in 1942 will approximate $1,500,000.

Among the women chemists employed at Hercules is Lura Shorb, active in the chemical industry during the last war, and today in charge of the extensive services of the technical library at the research center. Dr. Donna Price, a Cornell graduate; Dr. Elizabeth Osman from Bryn Mawr; and Lois Hans, one of the better-known women chemists in the specialized field of papermaking, are also on the staff of the Experiment Station.

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## JESSOP STEEL CO. PRAISED BY NAVY

Following a recent official inspection of the plant of the Jessop Steel Company, Washington, Pennsylvania, Admiral William Carleton Watts, U.S.N. (Ret.), highly praised officials of the company for the efficiency with which the mill is being operated.

In addressing the Jessop employees, the Admiral said, "I am here not only to give proof of the Navy's great interest in the work you are doing for us but also to emphasize the importance of your part in the National War Effort."

Speaking of the production of steel, the speaker stated that without steel, the battle is lost.

Admiral Watts made the tour of inspection as a special representative of the Secretary of the Navy, Col. Frank Knox.

◆

## FOXBORO AWARDED MINUTE MAN FLAG

On July 8, in recognition of payroll allotment subscriptions by over 95 per cent of its employees, The Foxboro Company, Foxboro, Massachusetts, was awarded the Minute Man Flag of the Treasury Department.


"Torture Testing" makes them BETTER FITTINGS!

*Samples of every heat of iron for Grinnell Malleable Fittings must "make the grade" in this tensile test machine.*

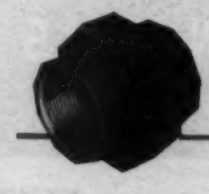
*The Rockwell hardness test is part of the daily routine for samples from each heat of Grinnell metal.*

**Grinnell Malleable Pipe Fittings must pass "brutal" physical tests**

Up, up, up . . . goes the tension on a test bar of Grinnell Malleable Iron. "Crack!" . . . and the bar fractures in the test machine, giving exact records of its tensile strength, yield points and elongation. Another sample from the same heat "gets the screws put on it" in a Rockwell hardness tester. Still another undergoes the crush-test.

Physical tests like these are a few of the daily quality-controls that Grinnell applies in making malleable iron fittings. These and other tests assure high uniformity, fine, clean surfaces, inside and out . . . smooth, true threads for easy starting and tight joints!

Specify Grinnell when you order malleable fittings, and you'll get the "extras" of this quality-control *without extra cost!* Available everywhere through wholesalers, heating and plumbing contractors and branch offices in principal cities. Grinnell Company, Inc., Executive Offices, Providence, R. I.



MALLEABLE IRON FITTINGS by

GRINNELL

WHENEVER PIPING IS INVOLVED

Following a noon-hour concert by the company's band, Alfred C. Sheehy, deputy state administrator of the War Savings Staff for Massachusetts, presented the flag and accompanying certificate to Irving W. Lane, second oldest employee of Foxboro Company.

◆

## MORE COMPANIES WIN GOV'T AWARDS

**De Laval Steam Turbine Company, Trenton, New Jersey**—On June 29, this company received the Navy "E" Burgee for outstanding achievement in the production of turbines, gears, pumps, and other equipment vital to the United States Navy. The presentation ceremonies were held in the War Memorial Building at Trenton, and were attended by about 1800 De Laval employees and invited guests. Rear Admiral William C. Watts, U.S.N. (retired) made the presentation, which was responded to by H. L. Watson, executive vice president of De Laval. Employees of the company received the "E" lapel insignia.

*Presentation of Navy "E" award to De Laval Steam Turbine Company. Left to right: Rear Admiral Wm. C. Watts, U.S.N. (Ret.); Lieut. (jg) Thomas Dewart, U.S.N. Office of Public Relations; Lieut. J. W. Gessford, U.S.N. Office of Public Relations; H. L. Watson, executive vice president of the company; H. W. Johnson, vice president and works manager, and an American Legion member.*

**National Bearing Metals Corporation, St. Louis, Missouri**—The Navy "E" Flag is today flying over this company's plant, signifying the excellence in production attained during the present emergency. National Bearing Metals has been manufacturing bearings, bearing metals, and special castings for over 68 years.

**S. F. Bowser & Company, Inc., Fort Wayne, Indiana**—James Forrestal, undersecretary of the Navy, notified this company on July 23, that it will receive the Army-Navy award for high achievement in the production of war equipment. The company will be presented with a flag, and all employees will receive pins. S. F. Bowser, normally engaged in the manufacture of gasoline and oil pumps and meters, is 95 per cent converted to war work.


Appleton Felts

Today's standard for paper mill felts, Appleton Felts meet the high speed production requirements of mills. Since 1890 Appleton Felts have been keeping pace with paper making—that's why.

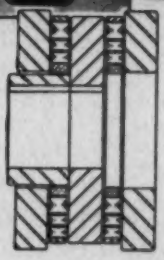
MAKE GOOD PAPER

APPLETON WOOLEN MILLS

APPLETON · WISCONSIN

# ROLLWAYS carry ONLY ONE load!

*Type DT Double-Acting THRUST bearing*



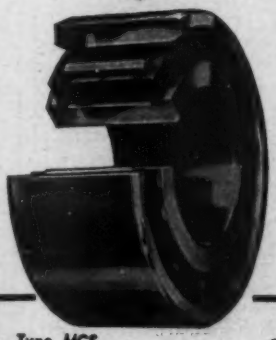
## Their right-angled loading helps to Solve the maintenance problems of the 3-SHIFT, 168-HOUR WEEK!

It's a common error to overlook the destructiveness and magnitude of *thrust* loads—particularly when thrust is not the main component of the load. But whether uniform or variable . . . whether the result of shock, vibration or reversal of torque . . . thrust can seriously affect the life and service of a bearing and of a machine.

That's why Rollway carries every thrust load on a *separate* bearing assembly of solid cylindrical rollers. Load per roller is lower. You get greater roller cross-section per unit of load . . . and greater ability to absorb shock, vibration and wear.

More—you get rid of all oblique and compound stresses with their bothersome resultants. And you get in *thrust* bearings the factors of safety, life expectancy, and low starting torque that you expect in radial bearings.

For longer wear, less service attention and fewer shut-downs, change over now to Rollways, *the roller bearing with right-angled loading.*



*Type MCS Double Width RADIAL bearing*

### STANDARD SIZES FOR MOST APPLICATIONS

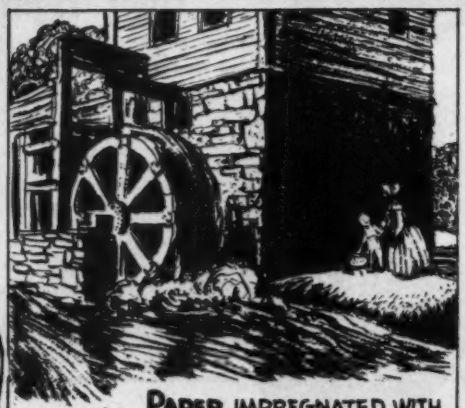
Rollway's large number of types and series permit designing to standard metric sizes that are not only correct mechanically and practical from a cost viewpoint, but that are easier to obtain and replace, particularly in times of emergency like these. Send us your designs for free bearing analysis and "engineered to the job" recommendations.

**ROLLWAY BEARING COMPANY, INC., SYRACUSE, N. Y.**

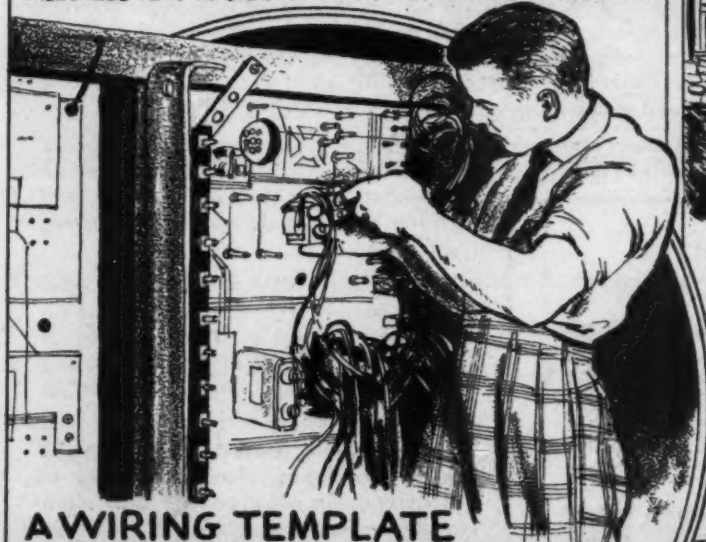
BUILDING HEAVY-DUTY BEARINGS SINCE 1908 **BEARINGS**

# PAPER SKETCHES

DURING MEDIAEVAL TIMES, A SPECIAL LIGHTWEIGHT EGYPTIAN "BIRD" PAPER WAS USED BY THE CALIPHS OF CAIRO FOR MESSAGES SENT TO DISTANT POINTS BY CARRIER-PIGEONS!



PAPER IMPREGNATED WITH GRAPHITE, STEATITE, PARAFFIN, TALLOW OR SOLUBLE GUMS WAS USED FOR LUBRICATING PURPOSES DURING THE EARLY 1800's



A WIRING TEMPLATE OF OIL RESISTANT PAPER PASTED TO THE BACK OF A CONTROL PANEL IN THE MAKING OF AN ELECTRIC CONTROL APPARATUS, INDICATES WHERE ALL PARTS MUST GO ON THE BOARD. THE USE OF THE TEMPLATE SPEEDS ASSEMBLY AND SIMPLIFIES MAINTENANCE OF THE CONTROL.

DURING THE TIME OF FUST AND SCHOEFFER (THE LATE 15TH CENTURY), PAPER, BECAUSE OF ITS ROUGHNESS AND HARDNESS, WAS DAMPENED AND SOFTENED PRIOR TO PRINTING FROM DELICATELY LINED WOOD CUTS.

# NOT TOO LITTLE

# NOT TOO LATE

RUBBER manufacture today is measured in terms of human safety, human liberty and human life.

Towards these demands it must do its duty first with all the means in its power. It must meet every demand on it that will help to win the war. Only as its primary duty permits can it hope to serve your customary purchase requirements.

If there are inconveniences and shortages remember that rubber is a war essential. It is fighting for us all and no one will want the supply for this purpose to be too little or too late.

BOSTON WOVEN HOSE AND RUBBER COMPANY

BWH

WORKS: CAMBRIDGE, MASS., U.S.A.

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# ASSOCIATIONS

## INDUSTRY URGED TO USE APPA'S WASH. OFFICE

All paper and pulp manufacturers are urged to make full use of the American Paper and Pulp Association's Washington office when seeking information or assistance. Since the outbreak of the War and consequent increase of visitors and inquiries, the scope of service of the office has been widened and now includes:

1) Assistance to specific companies in filing and following through on cases with WPB, OPA, ODT, and other Federal War agencies. (Does not include legal assistance.)

2) Obtaining information for specific companies on such Washington problems as the correct procedure, forms, rulings of the vast number of WPB, OPA, and other War agency regulations.

3) Extensive contacts for information and service with the Treasury, State, Commerce, and other departments and "peace-time" bureaus and agencies.

4) Keeping the Association informed on legislation which would affect the industry.

5) Facilities for helping with individual questions relating to export control, Government procurement, standardization, or any other Washington problems of a company.

◆

## TAPPI FALL MEETING WILL BE IN BOSTON

The national fall meeting of the Technical Association of the Pulp and Paper Industry which is under the direction of the New England Section will be held at the Statler Hotel in historic Boston, on September 29, 30, and October 1. Norman I. Bearse is general chairman of the meeting and the committee has held several meetings in Boston, Fitchburg, and Holyoke to prepare a program that will be justified in the present difficult times.

Tuesday, September 29, will be Federal Government Day. In the morning a general session will be held at which the various problems of both Government and the industry will be discussed. In the afternoon there will be a panel discussion to bring everyone up to date on developments in priorities, allocations, and substitution products. There will be ample time for questions, and members are urged to put their questions in writing and submit them in advance. Concurrent with the panel discussion, there will be a session to deal with engineering subjects.

On Wednesday morning, September 30, a Containers, Wraps, and Protective Coatings Symposium will be held. Some of the subjects to be discussed will be dehydrated foods packaging, Quartermaster Corps Requirements, Protective Coatings, Converters' Problems, etc. Wednesday afternoon will be Contact Day. It is realized by the General Committee that many people come to these meetings with a definite list of many people whom they wish to see. It is quite likely that the interest in the morning session will require a continuation into the afternoon. Wednesday afternoon also may be devoted to golf or mill visits.

On Thursday morning, October 1, there will be a symposium on Tub Sizing, and concurrently, a meeting sponsored by the Water Committee and one on Pulping and Pulp Purification. On Thursday afternoon the final Technical Session will be devoted to problems confronting Technical and Research Departments. This session will include personnel problems and also specification problems and changes.

The meeting will be brought to a close on Thursday night with a banquet and dance. A prominent columnist will be the speaker at the banquet.

◆

## RUBBER CONSERV. PRESENTED BEFORE MICH. SUPTS. MEET

At a meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents Association, July 30, Kalamazoo paper mill executives, superintendents, and maintenance men heard officials of the Goodyear Tire and Rubber Company discuss the necessity and means of industrial rubber products conservation. The meeting was held in the KVP Community House at Parchment, Michigan, and was attended by about 60 persons. Alfred Perlick, vice chairman of the Division, presided in the absence of Henry Nendorf, chairman.

Speakers on the program were Phil B. Eckels, Grand Rapids, district representative of Goodyear's mechanical rubber goods department, and W. D. Bradshaw, Akron, Ohio, head of the company's industrial rubber goods conservation service.

## JOHN F. DARROW LEAVES THE APPA

Announcement comes from the headquarters of the American Paper and Pulp Association in New York City that John F. Darrow, who has been in charge of its Washington office since that office was established, has left that post as of August 1. Mr. Darrow will be working in the Quartermaster's Corps in Washington.

Succeeding Mr. Darrow is Henry M. Gray, who has had many years of experience in the paper industry and who has recently been employed as a consultant in the Pulp and Paper Section of the OPA. Mr. Gray is well qualified to carry on the work of this important office of the Association.

◆

## DATE AND PLACE OF NAT. CHEM. EXPOS. CHANGED

Owing to the acquisition of the Stevens Hotel in Chicago by the United States Army, the Chicago Section of the American Chemical Society has made a change in the dates and location for its second National Chemical Exposition. The exposition and conference have been transferred to the Sherman Hotel and will take place from November 24 to 29, instead of a week earlier as originally planned.

No changes in the original program are planned. There will be daily conferences to be addressed by leaders in the chemical industry, educators, and other outstanding authorities.

◆

## CONVENTIONS AND COMING EVENTS

Sept. 29-Oct. 1—Fall meeting of the Technical Association of the Pulp and Paper Industry, Hotel Statler, Boston, Massachusetts.

Oct. 27-29—The Thirty-first National Safety Congress and Exposition at the Sherman, LaSalle, and Morrison Hotels, Chicago.

Nov. 24-29—National Chemical Exposition, at the Sherman Hotel, Chicago.

Nov. 30-Dec. 5—15th National Exposition of Power & Mechanical Engineering, Grand Central Palace, New York City.

Dec. 4-5—Pacific Coast Division of the American Pulp and Paper Mill Superintendents Association. (Place to be announced.)

# THEY'RE TOUGH . . .
# THESE 125 lb. GATE VALVES

And they're proving it in countless plants in all industries. The extra strength built into these tough bronze valves comes in good stead in meeting the severe demands of continuous operation. Now more than ever they are proving to their users that it pays in the end to buy good valves first.

Figs. 2125 and 2129 are outstanding examples of the ruggedness and dependability that are inherent qualities in all Lunkenheimer products.

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THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI, OHIO, U. S. A.
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Since virtually all materials used in the manufacture of valves are on the list of critical materials, valve users are urged to furnish the highest possible preference ratings and proper "end use" Allocation Classification Symbols on their orders. This will be of mutual helpfulness.

# LUNKENHEIMER VALVES

# S A F E T Y

## PAPER & PULP ACCIDENT RATES FOR YEAR 1941

The National Safety Council has just released *Accident Rates in the Paper and Pulp Industry 1941*. The Council publishes an annual pamphlet of this same kind for each of 24 industries or industry groups.

Highlighting the 1941 experience in the paper and pulp industry are the following outstanding facts:

1) Nineteen forty-one records were reported by 277 mills—the largest coverage of the industry ever reported to the National Safety Council.

2) The industry's average frequency rate was 17.37 reportable injuries per million hours worked—up 11 per cent from 1940.

3) Severity rates averaged 1.66 days disability per thousand hours worked—up 5 per cent from 1940.

4) The net improvement since 1926 was 67 per cent for frequency and 55 per cent for severity. The paper and pulp industry has kept pace with other industries in reducing injury rates.

5) The largest increases in injury rates from 1940 were in remanufacturing; frequency was up 38 per cent and severity rose 61 per cent.

6) Board mills had the highest 1941 injury rates, averaging 28.40 for frequency and 2.61 for severity.

7) Only pulp mills had lower rates in 1941 than in 1940, reducing frequency 2 per cent and severity 66 per cent.

8) Small mills had the worst 1941 records, averaging 21.23 for frequency and 1.84 for severity.

### Increases in 1941 Rates

Nineteen forty-one injury records were the worst in recent years. Injury rates have increased since 1938. Increases of 11 per cent in frequency and 5 per cent in severity from 1940 compare unfavorably with an average rise of 8 per cent in frequency and an average decrease of 8 per cent in severity for all industries.

| Industry | Freq. Changes (per cent) 1940 to 1941 | Freq. Changes (per cent) 1926 to 1941 | Sev. Changes (per cent) 1940 to 1941 | Sev. Changes (per cent) 1926 to 1941 |
|---|---|---|---|---|
| Paper and Pulp | +11 | —67 | + 5 | —55 |
| All Industries | + 8 | —67 | — 8 | —52 |
| Rubber | +13 | —70 | — 2 | —49 |
| Chemical | + 8 | —70 | —50 | —32 |
| Steel | + 5 | —63 | + 5 | —26 |
| Woodworking | +31 | —29 | —17 | —41 |
| Lumbering | + 9 | —56 | — 2 | —47 |

Operations, according to man-hours worked, expanded rapidly during 1941. The increase in new employees, addition of new equipment, and speed-up in production was accompanied by higher rates, particularly in remanufacturing—38 per cent for frequency and 61 per cent for severity. Rates soared in box and container factories and there were also sharp increases in the rates for board mills.

The industry's unfavorable 1941 experience was partly due to higher rates in large and middle-sized plants. The only improvement was an average reduction of 19 per cent in the severity rates of small units.

## NEW LOCATION AND DATES FOR N. S. CONGRESS

The thirty-first National Safety Congress and Exposition will be held October 27-29 in the Sherman, LaSalle and Morrison Hotels, Chicago. The Stevens Hotel, headquarters for the Congress when held in Chicago, has been taken over by the Government. This necessitated changing plans for the Congress and also caused the new dates to be set.

The Congress this year will be streamlined for action—having been reduced to three days from the usual five, because of governmental curtailment on week-end travel, etc.—and dedicated to victory. The entire Congress will be on a wartime note. There will be 200 sessions, 500 speakers, and from start to finish the emphasis will be on the part that safety must play in winning the War.

The National Safety Council has received a formal proclamation from President Roosevelt asking for a nation-wide attack on accidents that are hindering war production and thus delaying victory. As a result, the War Production Fund to Conserve Manpower was organized, with William A. Irvin, former president of the U. S. Steel Corporation, as chairman of the Fund. Hundreds of top-notch business and industrial executives throughout the country are serving actively on committees of the Fund that are seeking to raise $5,000,000—the minimum amount needed to put across the expanded safety program requested by President Roosevelt.

The Congress headquarters will be in the Sherman Hotel, as also will be the Exposition. The various sections will meet in the LaSalle and the Morrison.

▶▶▶ THE PAPER AND PULP SECTION will meet on Tuesday, October 27, and Thursday, the 29th, in the American Room of the LaSalle Hotel. The annual luncheon of the Section will be held in the American Room of the LaSalle at 12:30 P. M. on Thursday, the 29th.

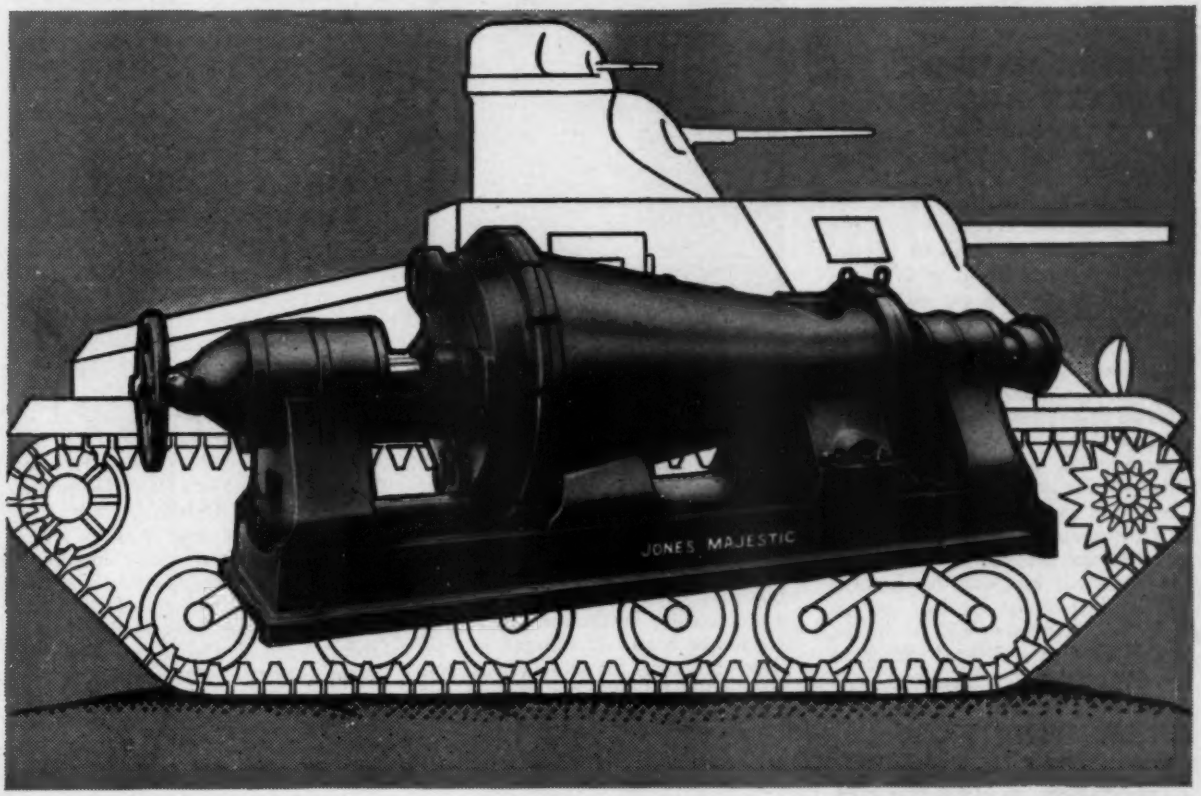
### CONTEST SCORES

**The annual contest among mills in the Paper and Pulp Section of the National Safety Council closed June 30.**

**Due to the fact that all reports must be in before final scores can be published, additional time is needed to figure scores following the close of the contest. Therefore, the final scores, as of June 30, were not ready when this issue went to press.**

**Watch this section for closing figures on the contest.**

# THE WORK THE NEW JORDAN YOU WANTED IS DOING . . .




Metal for war equipment takes first call today. And we are pouring metal aplenty for just that purpose. Almost our entire productive effort is directed toward producing vitally needed war equipment. Yet, we always are ready to help you with your maintenance and conservation needs within present-day limitations, whether for Jordans, Beaters, Screens or Pulpers. Write us your particular problem. We'll try to solve it for you with every resource at our command.

**Jones**

**E. D. JONES & SONS COMPANY-PITTSFIELD, MASS.**

Builders of Quality Machinery for Paper Mills

# NAMES *in the* NEWS

## *Personals*

### WALTER CASSIDY LEAVES AWP CORP.

Walter Cassidy, who has been connected with the American Writing Paper Corporation of Holyoke, Massachusetts, for the past 18 years, has resigned to become associated with the technical control department of the Hawthorne Paper Company of Kalamazoo, Michigan.

Mr. Cassidy joined the AWP company as a laboratory technician after his graduation from Holy Cross College, and then entered the manufacturing side of business under his father, the late Henry C. Cassidy, who was superintendent of the old Holyoke Division. For the past eight years, Mr. Cassidy has specialized in the manufacture of reproduction, blueprint, and negative papers, a field in which AWP has pioneered. His work has brought him considerable recognition, and his duties at Hawthorne will be in the further research and development of this type of paper.

◆

### CHAS. SAGE NOW PRES. SPRUCE FALLS POWER & PAPER CO.

Succeeding F. J. Sensenbrenner, retired, Charles H. Sage of Neenah, Wisconsin, has been elected president of the Spruce Falls Power and Paper Company, Ltd., Kapuskasing, Ontario.

Mr. Sage is also connected with the United Wallpaper Factories, Inc., Chicago, and the Kimberly-Clark Corporation, Neenah, where he began work as an office boy in 1907.

◆

### N. H. DEARBORN SUCCEEDS CAMERON AS DIR. OF N.S.C.

After almost 30 years as managing director of the National Safety Council, Chicago, W. H. Cameron is retiring, to be succeeded by Ned H. Dearborn, who has been dean of the division of general education of New York University, New York City, since 1934. The appointment of Mr. Dearborn as executive vice president and managing director of the Council was announced by Col. John Stilwell, president, on July 20.

*Ned H. Dearborn*

Mr. Dearborn has had wide administrative experience, well qualifying him to direct the greatly expanded wartime program now being conducted by the National Safety Council as a result of a proclamation by President Roosevelt. He has been actively engaged in accident prevention for several years, and was responsible for the development four years ago of the Center for Safety Education at New York University. He has been vice president for education of the Council for two years, and for the last year has been chairman of the Council's special finance support committee.

Mr. Cameron was manager of the casualty and safety departments of the American Steel Foundries in Chicago, before he became the active head of the Council when it was organized in 1913. Under his leadership, it has grown from an organization consisting of Mr. Cameron and a secretary to its present leadership in the safety field, with a headquarters staff of 140 persons.

*W. H. Cameron*

◆

### OLIVER H. CLAPP LEAVES STEIN, HALL

Oliver H. Clapp has resigned as an assistant vice president of Stein, Hall & Company, Inc., New York City, to become associated with the Defense Supplies Corporation, Washington, D. C. He assumed his new duties on July 6.

Mr. Clapp has spent nearly all of his business life in the burlap trade and has been associated with Stein-Hall for many years. Since last December, when Morris S. Rosenthal, a vice president of the company, went to Washington to become assistant director of the Board of Economic Warfare, Mr. Clapp has been in charge of the burlap division of Stein-Hall's foreign department. Cecil H. Coryat and Robert M. Stein, assistant vice presidents, are assuming Mr. Clapp's former duties with the company.

◆

### H. K. McCOOK JOINS N.A.M. WASH. STAFF

To assist in co-ordinating activities of the National Association of Manufacturers War Committee with those of the Government war agencies, H. Kennedy McCook, wartime priorities specialist, has joined the Washington Staff of the Association. He has also taken over the technical service functions formerly performed by Harry L. Coe, resigned.

Mr. McCook has gained wide experience for this work from almost two years with the WPB, and more than twenty-five years as a practitioner of departmental law in Washington. He was associated with the Advisory Commission to the Council of National Defense in November, 1940, and when OPM was established, Mr. McCook was appointed chief of information in the Priorities Division, and later became an assistant to the head of the Materials Division. When OPM was reorganized, he was appointed head priority specialist of the Materials Division.

# Report on SANTOBRITE An "Essential Employe"

**QUICK FACTS ABOUT SANTOBRITE**

1. Chemically stable.
2. Non-corrosive to metals.
3. Non-volatile.
4. Practically odorless.
5. Requires no expensive apparatus for satisfactory application.
6. Is not spent on organic matter as is chlorine. Instead, it tends to concentrate in the system.
7. Involves no hazard, when properly handled, to health of mill operators or product users.

IF allowed to thrive unchecked, microorganisms in a paper mill soon cause slime spots and breaks . . . blinded wires and clogged felts . . . dirty stock . . . clogged water lines . . . rotted felts . . . and a host of other threats to efficient operation.

That's why Santobrite, Monsanto's highly effective fungicide and bactericide, is so important in a paper mill.

And that's why Monsanto, in spite of raw material shortages, will do its best to supply Santobrite as long as it can without hampering the war program to which all manufacturers are first dedicated.

For experienced technical advice on how you can use Santobrite to the greatest advantage in your mill and how you can make your present supply go further, write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, St. Louis, Missouri.

MONSANTO CHEMICALS — SANTOBRITE FOR MICROORGANISM CONTROL

"E" for Excellence . . . The Navy "E" . . . denoting the highest service accomplishments of the United States Navy . . . awarded to Monsanto December 31, 1941 "in recognition of production of ordnance material vital to our national defense."

## W. J. LAMORY IS NOW WITH MOHAWK MILLS

William J. Lamory has recently accepted the position of general superintendent with Mohawk Paper Mills, Inc., Cohoes, New York. This involves no other organization change, as Mr. Lamory is an addition to the staff.

For the past four and one-half years, Mr. Lamory has been superintendent of a four-machine paper mill of the Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin. Prior to that, he was associated with the American Writing Paper Corporation, Holyoke, Massachusetts, as production assistant to the president.

◆

▶▶▶ President of the Saniwax Paper Company of Kalamazoo, Michigan, *Stuart Irvine* reported for active duty late in July with the Army's Third Air Force at Birmingham, Alabama. A veteran of World War I, Mr. Irvine had been a reserve officer since 1919, and he had received his captain's commission in the officers reserve in 1929. Mr. Irvine was chairman of the Kalamazoo County Air Force Sponsoring Committee until shortly before he reported for duty.

◆

## HUNTLEY RESIGNS FROM OSWEGO FALLS

Resigning as technical director of the Oswego Falls Corporation and the Sealright Corporation of Fulton, New York, Robert F. Huntley has assumed the position of vice president and general manager of the Cowles Detergent Company of Cleveland, Ohio.

Mr. Huntley has been associated with the Fulton organizations since his graduation from the New York State College of Forestry, Syracuse, New York, in 1927. He was one of the charter members of the Empire State Section of TAPPI and served as president of the section in 1939, when the section acted as host to a successful National Fall Convention of TAPPI held in Syracuse.

◆

## MORTENSEN IS PROMOTED BY ALLIS-CHALMERS

S. H. Mortensen, engineer in charge of a-c. design at Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, for the past ten years, has been appointed chief electrical engineer of the company's plants at West Allis, Cincinnati, Boston, and Pittsburgh.

Mr. Mortensen has been associated with Allis-Chalmers since 1905, and has been responsible for pioneer work in the development of self-starting synchronous motors, synchronous condensers, and turbo-generators. In addition to contributing numerous articles and papers on electrical operation and design to leading professional papers, he has been the author of a textbook on motor and generator design, and more recently, a co-author of the *Standard Handbook for Electrical Engineers.*

◆

## C. G. BONNER NOW TREASURER POMONA PUMP CO.

Formerly comptroller and more recently treasurer of The Brunswick-Balke-Collender Company of Chicago, C. Granniss Bonner has been elected treasurer of Pomona Pump Company, Pomona, California.

C. G. Bonner

Mr. Bonner succeeds Donald C. McKenna, vice president, and former treasurer, who will devote full time to the production activities of the company's four manufacturing plants. Besides producing pumps for every direct and associated war effort, Pomona has undertaken a heavy schedule of marine engine and maritime fittings manufacture.

◆

▶▶▶ The Kraft Paper Association has elected as president *W. J. Dixon,* vice president and secretary of the St. Regis Paper Company, New York City. Mr. Dixon succeeds *E. R. Gay,* vice president of the same company, who has been called to duty with the War Production Board.

◆

## THOS. W. CHALMERS RETIRES AFTER 63 YEARS WITH A.W.P.

Associated with the American Writing Paper Corporation, Holyoke, Massachusetts, for the past 63 years, Thomas W. Chalmers has retired at the age of 80.

Mr. Chalmers was hardly 17 when he joined the Eagle-A concern in 1879, his first job being a calender helper at the Wauregan Division. During his long career, Mr. Chalmers has worked in several of the A.W.P. divisions in various capacities, and in 1938 became watchman at the Mt. Tom Division, from which position he is resigning.

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## M. J. CORNELL HAS RETIRED FROM J. P. LEWIS CO.

Merritt J. Cornell, general superintendent of the J. P. Lewis Company in Beaver Falls, New York, for the past 13 years, retired from the company on June 1. Since he first began work in the paper mills of the Angel Langdon Paper Company, Greenwich, New York, 50 years ago last December, Mr. Cornell's entire career has been connected with the industry.

Active in the American Pulp and Paper Mill Superintendents Association, Mr. Cornell has been a member of the Northern New York Division (now New York-Canadian Division) since it was organized in Watertown, New York, in 1920. He will continue to reside in Beaver Falls, New York.

◆

▶▶▶ Assistant sales manager of Hoberg Paper Mills, Green Bay, Wisconsin, *John Maloney, Jr.,* is in Washington, D. C., serving in an advisory capacity for the toilet, towel, and napkin industry to David Winton, chief of the Pulp and Paper Section of WPB.

◆

## SPICKERMAN PLANS TO RETIRE FROM WHITING-PLOVER

After 35 years as sales manager of Whiting-Plover Paper Company, Stevens Point, Wisconsin, C. W. Spickerman has announced his plan to retire from active service within six months. He will reside in Florida and act only in an advisory capacity with Whiting-Plover.

Mr. Spickerman has spent 45 years in the paper industry, starting in the warehouse of the Diem and Wing Paper Company, Cincinnati, Ohio. After a few months in this capacity, he went on the road as one of the industry's youngest salesmen. Mr. Spickerman's duties at Whiting-Plover will be assumed by other members of the company.

◆

▶▶▶ *Paul B. Fowler,* for the past several years assistant superintendent of the Crocker-McElwain Company of Holyoke, Massachusetts, has been commissioned a lieutenant junior grade in the Naval Reserve. After attending training school, he will be sent on active duty with a navy gun crew on a merchant ship, one of the more hazardous assignments in the Navy.

# COLOR

## *serves on another front*

The paper industry is confronted with the need of replacing critical materials with paper products. It may be necessary to shift to selective production of paper products for the most essential uses. This requires planning for adequate supplies of pulp, paper and paper products both for direct war use and essential civilian needs. This program must be carried out despite restrictions in the use of critical materials and the accompanying need for conservation.

Many of these products will carry color for efficiency and safety. Dyes will be used for standardizing, tinting and identifying paper products for the armed forces—for all essential communications.

To best utilize available dyestuffs for the many paper products required is a job for du Pont dyestuff technicians. The services of our specially trained sales and technical staff are at your disposal to help solve the many dyeing problems which are certain to occur.

**E. I. DU PONT DE NEMOURS & COMPANY, (INC.)**
**Organic Chemicals Department, Dyestuffs Division**
**Wilmington, Delaware**

DU PONT DYESTUFFS
REG. U.S. PAT. OFF.

# Necrology

## NELSON R. DAVIS

A past president of the Northeastern Division of the American Pulp and Paper Mill Superintendents Association, Nelson R. Davis passed away on July 15 in Portland, Maine. His last connection with the industry was as superintendent of the S. D. Warren Paper Company's mill in Westbrook, Maine, from which position he retired in 1932.

Mr. Davis was born in Sanford, Maine. As a young boy, he moved with his parents to Watertown, Massachusetts, where he received his education. In 1901, he graduated from Harvard, and in July of that year, moved to Westbrook and became associated with the Warren mill. Active in the Superintendents Association, Mr. Davis played an important part in the Association's convention in Dayton, Ohio, in 1924, when he acted as presiding officer and principal speaker.

He was 65 years old and is survived by three daughters.

◆

## ELTON L. PUFFER

A member of the Heller & Merz Department of Calco Chemical Division, American Cyanamid Company, Bound Brook, New Jersey, Elton L. Puffer passed away at his home in Dayton, Ohio, on July 30. Mr. Puffer was a graduate of the University of Pennsylvania. He joined the Calco staff in 1924. Mr. Puffer was actively interested in the paper industry through his father, who had been identified with the Eastern Manufacturing Company for many years.

Surviving are his widow and one son, as well as his parents.

◆

## U. GRANT FARMER

Ulysses Grant Farmer, plant superintendent of the board mill of Fibreboard Products, Inc., Los Angeles, California, passed away on July 1, at the age of 57.

Mr. Farmer was born in Uniontown, Pennsylvania, and started his papermaking career in Noblesville, Indiana, at the age of 16. In 1906, he went to the West Coast and worked with the Crown Willamette Paper Company at Camas, Washington. He went to Antioch, California, in 1908, working for the company which is now Fibreboard Products, Inc., but which was then called the California Paper and Board Mills, a Division of The Paraffine Companies. Except for the period from 1909 to 1912, when he worked for the El Rey Paper Company in Los Angeles, and for a short time later when he worked as an electrician until the Antioch mill, destroyed by fire in November, 1912, was rebuilt, Mr. Farmer had been with Fibreboard Products. He was made superintendent of the board mill in 1926 and continued in that capacity until his passing. He was a member of the American Pulp and Paper Mill Superintendents Association.

He is survived by a daughter and two sons.

◆

## AUGUST F. RICHTER

August F. Richter, 68, consulting engineer and former president of the Stebbins Engineering & Manufacturing Company, Watertown, New York, passed away at his home on July 16.

*August F. Richter*

Mr. Richter began his business career as a clerk and timekeeper for the Remington Paper Company of Watertown. After two years, he left to help in the construction of the plant of the High Falls Sulphite Pulp & Mining Company, where he later served as superintendent. He held that position until 1898, when he formed a partnership with the late Henry W. Stebbins, known as Stebbins & Richter.

In 1903, the firm of Stebbins Engineering & Manufacturing Company was incorporated, with H. W. Stebbins as president, and Mr. Richter as treasurer. In 1909, Mr. Richter purchased the interests of Mr. Stebbins and became president of the company. In 1918, he purchased the interests of the late G. A. Stebbins, son of H. W., who had been serving as secretary and treasurer, thus acquiring the controlling interest of the company. He also became treasurer at that time, which office he held until about 1930. Mr. Richter resigned as president in 1935, to devote his entire time to research and development of new lining materials for the benefit of his corporation. His son, Carl F. Richter, became president.

Mr. Richter is survived by his widow, a son, daughter, and stepdaughter.

◆

## PERRY M. WILSON

Perry M. Wilson, 57, secretary-treasurer of the Marathon Paper Mills Company, Rothschild, Wisconsin, passed away July 19.

Mr. Wilson was born in Manistee, Michigan, in 1885, and moved to Wausau as a boy. He was graduated from the Wausau High School and from the Biltmore School of Forestry at Asheville, North Carolina. Shortly after, on February 15, 1909, he became the first employee of Marathon Paper Mills, the company having been organized on February 13, 1909. He was elected secretary of the firm in December, 1927, and was named treasurer in July, 1934, to succeed his father, the late B. F. Wilson, a pioneer Wausau lumberman.

Mr. Wilson was also active in the management of the Wilson Mercantile Company, Wausau, which his father founded, and was president of the firm at the time of his passing.

Surviving are his widow, a daughter, and three sons.

◆

## A. W. DRISCOLL

Arthur William Driscoll, production superintendent at the Livermore Falls (Maine) mill of the International Paper Company, passed away suddenly at his cottage on Pocassett Lake on July 6, his 65th birthday.

A native of East Pepperell, Massachusetts, Mr. Driscoll had been associated with the International Paper Company since he was 19 years old.

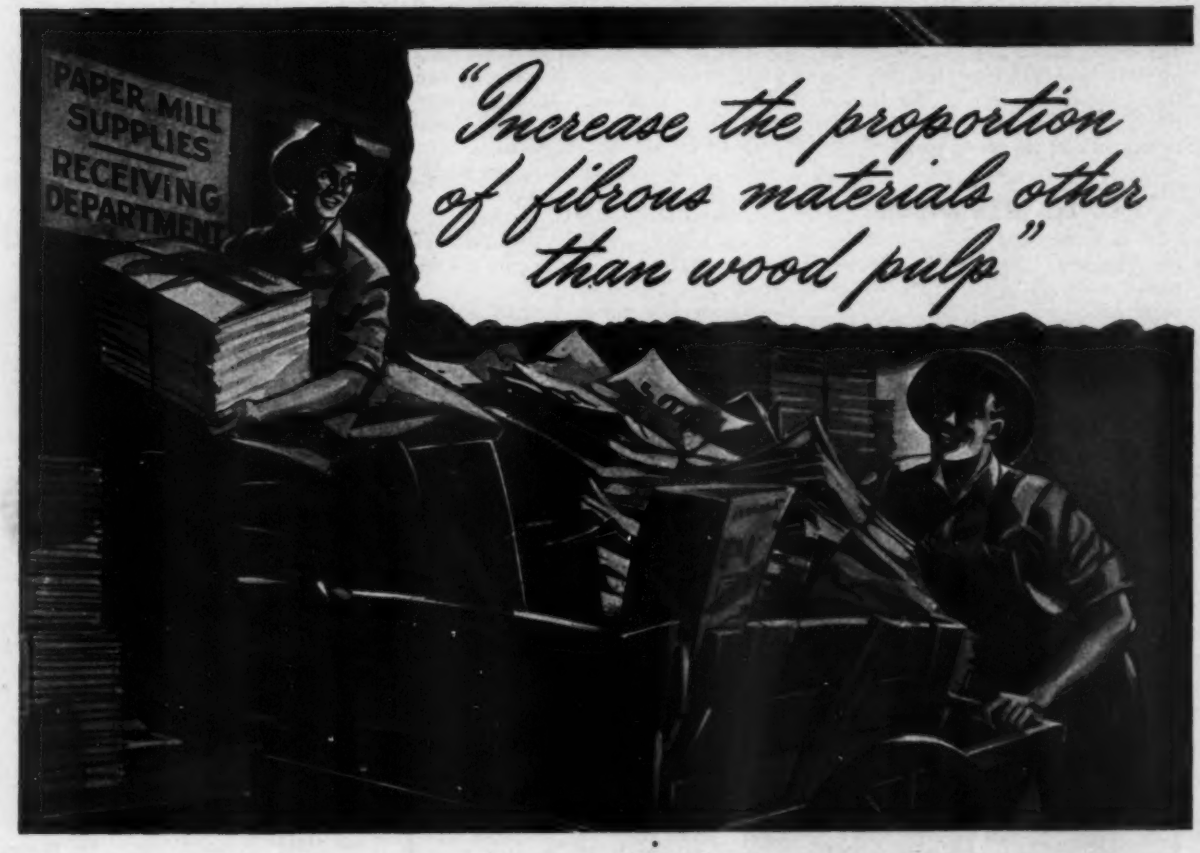
◆

## ROBERT F. RUNGE

Vice president of SKF Industries, Inc., Philadelphia, since 1920, Robert F. Runge passed away July 6. He was 56 years old.

Mr. Runge was born in Woodbury, New Jersey. He was graduated from Drexel Institute in 1906 and went to work in the engineering department of the Hess-Bright Manufacturing Company, which later became SKF. His entire career was spent with this firm and its predecessor, Hess-Bright.

Among his other activities, Mr. Runge had been a trustee of Drexel




MANY PAPER MANUFACTURERS are having trouble in complying with Government requirements for increased production of paper and board from a curtailed allocation of wood pulp. They are obliged to increase the proportion of reclaimed paper and other low grade raw stock in their beaters. They can produce more sheetage only by reducing base weights. Both alternatives add to the difficulties of machine operation. Hamilton Felts materially reduce these difficulties. By removing more water at the wet end of paper machines, Hamilton Felts deliver firmer, better formed, stronger sheets to the driers. Even though these sheets contain a larger proportion of fibrous materials other than wood pulp there is less broke. Stops for adjustment are fewer. The finished product is the best that can be made from the available materials.

*From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.*

**SHULER & BENNINGHOFEN, HAMILTON, OHIO**

Miami Woolen Mills

**Hamilton Felts**

Established 1858

Institute since 1935, was president of the Metal Manufacturers Association in 1941, and had been a member of the American Society of Mechanical Engineers and the Society of Automotive Engineers for many years.

◆

## C. A. WISWALL

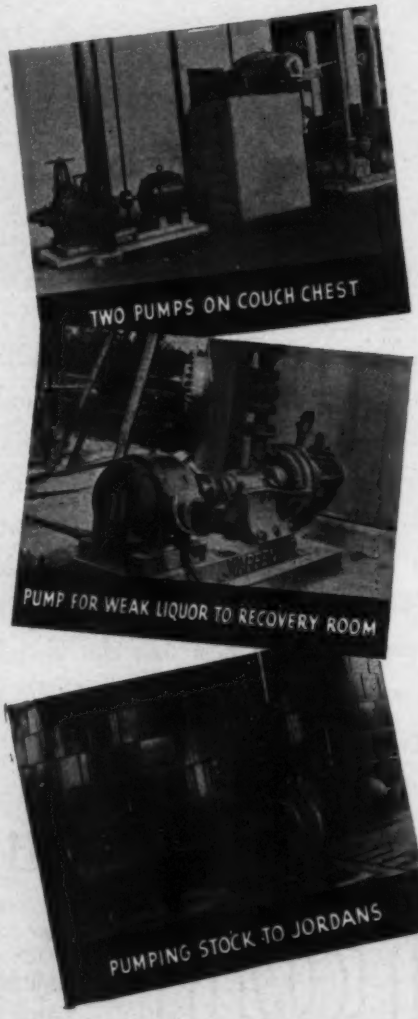
A New England paper mill industry pioneer, Clarence A. Wiswall passed away on July 21. He was 87 years of age.

A native of Newton, Massachusetts, Mr. Wiswall entered the paper industry with his father at the age of 18. From 1880 until 1892, he operated a mill in Newton and later operated mills in Waltham, Wakefield, and Bradford, Vermont. In later years, until he retired in 1930, he was associated with his son, Augustus C. Wiswall, in the operation of the Wakefield Paper Box Company.

A few years ago, Mr. Wiswall published a book entitled "100 Years of Paper Making," a history of the industry.

Besides the son with whom he was associated in the paper converting business, another son and two daughters survive.


"A WARREN PUMP WORKS UNDER ANY CONDITIONS"




Thanks, Mr. Engineer . . . even if our own claims are more modest! This comment was recently made by the Chief Engineer of one of the largest manufacturers of fine papers and was based upon conclusions arrived at after many years experience in the Paper Mill field. Our installations in this mill include some of the most difficult services and in each case the pumping equipment was engineered to fit the particular conditions under which it was intended to operate. Warren can build pumps to fit *your* job, too. Why not give us a chance?

WARREN STEAM PUMP COMPANY, INC.

WARREN, MASSACHUSETTS


## SHERMAN B. WARD

Sherman B. Ward, president of Stowe-Woodward, Inc., Newton Upper Falls, Massachusetts, passed away on July 3. Mr. Ward became associated with Stowe-Woodward in 1916 as treasurer and was made president in 1932.

He was 53 years of age and is survived by his widow.

◆

## DR. H. G. KNIGHT

Chief of the Department of Agriculture Bureau of Agricultural Chemistry and Engineering, Washington, D. C., Dr. Henry Granger Knight passed away on July 14. He was 63 years old.

Dr. Knight was born in Bennington, Kansas, and was graduated from the University of Washington. He did postgraduate work at the University of Illinois, University of Chicago, where he became an instructor, and Cornell University. Of Dr. Knight, Secretary Wickard said he had been "an important factor in the development of scientific agriculture and the relationship between farming and industry."

◆

▶▶▶ A pioneer in the pulp and paper industry in Europe and British Columbia, *John Moravec,* aged 88, passed away in Vancouver recently. He was born in Old Austria and came to Chatham, New Brunswick, in 1895. He was technical manager of the Whalen Pulp and Paper Mills at Woodfibre, British Columbia, from 1909 until 1919, when he retired and went to Vancouver to live. Mr. Moravec continued his interest in the pulp and paper industry until the time of his passing.

◆

▶▶▶ *Burt L. Morehouse,* former superintendent of the Lyons Falls (New York) plant of the Gould Paper Company, passed away July 15. He was 71 years old. His widow, two daughters, and two sons survive.

◆

▶▶▶ President of the Newark Boxboard Company, Newark, New Jersey, *Frederick H. McEwan* passed away at the age of 64. Mr. McEwan established the Newark company 30 years ago, before which he was associated with his father and five brothers in the paperboard and box industry.

◆

▶▶▶ On July 8, *Earl Comstock Moss* passed away. For the past 35 years, Mr. Moss had been representative and district manager of the Chicago office of Morse Chain Company, Division of Borg-Warner Corporation.

*War demand for asbestos may soon cross out Asbestos Dryer Felts for the Duration*

here's the answer in a

**NEW All-Cotton Felt**

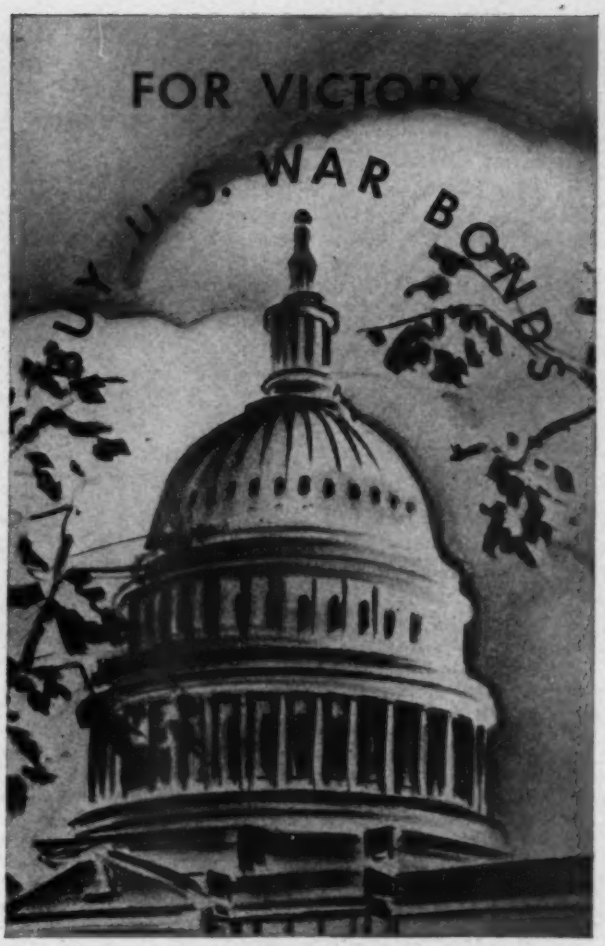
*the* **BRANDON** *SPECIAL No. 54*

High as asbestos in porosity
Low as cotton in price
Pre-shrunk and stretched

*Rugged enough for the toughest job*
*Soft enough for the finest sheet....*

**MOREY**
**Paper Mill Supply Co.**
309 South Street, Fitchburg, Massachusetts

*(Sole Agents Brandon Dryer Felts)*

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The use of quality materials is a good guarantee against unnecessary interruptions of top-speed production. That is why Garlock packings and gaskets are in use in so many factories today.

From past experience industry knows it can rely on Garlock quality for the long, dependable service so vital in today's war effort.

THE GARLOCK PACKING COMPANY
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*Garlock*

# Maintenance and Conservation Forum

## Packing, Insulation and Roofing

**(Compiled by Packing, Insulation and Roofing Committee. Chairman—J. W. Hemphill, Johns-Manville.)**

### HOW TO PACK A STUFFING BOX

Remove all old packing from the stuffing box.

Clean box thoroughly, removing accumulations from walls.

Keep packing clean during application. The scoring of rods, shafts or sleeves, oftentimes, results from grit or foreign matter picked up by the packing.

Determine size of packing required by checking diameter of rod or shaft and the inside diameter of the stuffing box. Rods wear and the packing has to compensate for this wear.

Never wind a length of packing into a stuffing box. Use packing in ring form only.

Cut spiral or coil form packings over a shaft or mandrel of exactly the same size as the one on which the packing is to be used in order to get close fitting rings.

Obtain sharp, clean cuts on soft packings, that tend to squash or become ragged, by simply applying a small piece of friction tape at the place where the packing is to be cut. It is advisable to remove the tape when installing the rings. String also serves well for tying the packing on each side of where the cut is to be made and may be left on the packing when installed.

Cut all packing ring joints to a snug fit making the rings meet with a tight butt or bevel joint.

Seat each packing ring carefully before placing the next one in the box. Loading a stuffing box with packing and then pulling up on the gland follower, may cause excessive deformation of the first two rings, building up localized gland pressure and failure to seat the bottom rings so they can work effectively.

Install all packing rings so that the joints are staggered and kept approximately 90 degrees apart. Spot the joints in clockwise direction to facilitate locating them when removing the packing.

Pull up the gland follower, sufficiently tight, after the packing has been installed to insure final seating of the packing. The nuts should be backed off two or three turns to relieve excessive pressure. Adjust packing to operating conditions.

Keep the following in mind for stuffing boxes provided with water, oil or grease lanterns.

a. Make sure that the lantern is so located in the box that as the packing is taken up, the lantern will be advanced to its proper location with respect to the opening in the box.

b. Check to see that the opening into the stuffing box is free from obstructions so that the sealing water or lubrication can flow into the lantern.

Allow packing to leak a small amount, if possible, when starting a newly packed pump. Take up the gland slowly as the packing seats.

Provide means for lubricating the rod and packing wherever possible.

Finally, carefully wrap all extra packings, place them back in their container as a precaution against waste and the possibility of their picking up dirt and other injurious foreign substances.

### EXAMINE USED PACKING

Carefully examine packing removed from a stuffing box, as it often gives clues to the condition of the equipment and may be the means of solving packing problems. The following clues and possible troubles were found by examining sets of packing which had seen service:

Clue: Excessive reductions in the cross-section of the packing directly beneath the rod, shaft or plunger.

Possible trouble: Low bearings and shaft or rod riding on packing. In service early leakage occurs around the top of the shaft or rod.

Clue: Excessive reduction in the thickness of the packing directly over or on either side of rod or shaft.

Possible trouble: Rod or plunger out of alignment and in the case of the rod or shaft, the bearings may be badly worn causing whipping of the shaft.

Clue: One or more rings missing from set.

Possible trouble: Bottom of stuffing box badly worn, with packing being extruded into system. Considerable difficulty, such as packing getting into the valves, traps or contaminating the fluid handled, may result.

Clue: Bulge in the side of one or more rings.

Possible trouble: Adjacent rings cut too short causing packing under pressure to be forced into the open space.

Clue: Wear on the outside diameter of the packing.

Possible trouble: Rings rotating with shaft or loose in the box.

Clue: Rings next to gland followers badly deformed with bottom rings in fair condition.

Possible trouble: Improper installation of packings and excessive gland pressure used.

Clue: Packings showing tendency to sheet out or extrude between rod or shaft and the gland follower.

Possible trouble: Excessive pressure or more likely too great a clearance between the rod or shaft and the gland follower.

Clue: Wearing face of rings dried and charred with rest of packing in good condition.

Possible trouble: High temperatures with lack of lubrication.

*Cutting Packing Rings*—It is common practice when cutting packing rings, to fit each one over the shaft or mandrel, individually. Much time can be saved if the packing can be tightly spiralled in a very close spiral directly on the shaft or mandrel, then laying a straight edge across the packing parallel to the axis of the shaft and carefully marking or scribing the packing. The packing may then be removed from the shaft or mandrel and the packing cut on a flat surface at the place marked. Perfect fitting rings will then be obtained and it is much easier to cut the rings with any type of joint that the operator may consider satisfactory.

#### Helpful Hints for Handling Packing

The better the condition of the equipment the longer the packings will last.

Keep bearings in alignment. Packing is for sealing and cannot take the place of bearings.

Use packings of correct size. Oversize packings are difficult to install and may cause excessive friction. Undersize packings may be ruined by too much takeup.

Don't be afraid to let packing leak a small amount. It is good assurance that packing is not too tight and the liquid usually has some lubricating qualities.

Where leakage cannot be permitted, provide a means of introducing a sealing or lubricating fluid such as water, oil or grease into the stuffing box. The dead weight sealer developed by Worthington Pump & Machinery Corporation, has proved effective.

When renewing packing, use all new, clean packing. Worn packings are dry, highly compressed, have high friction and may develop scoring.

Remember packing is relatively cheap. Labor and materials necessary to replace worn shafts, sleeves or rods are expensive and critical commodities.

Think of every stuffing box as brake assembly that must develop the minimum frictional resistance. Pressure times velocity in feet per minute, times coefficient of friction, is a measure of the energy absorbed by a stuffing box.

Line up flanged packing surfaces. No gasketing material is compressible enough to compensate for flanges out of parallel.

Use expansion joints to take care of ex-

This is the second installment of the Maintenance and Conservation data presented at the annual meeting of **The American Pulp and Paper Mill Superintendents Association,** Grand Rapids, Michigan, June 16-18, 1942. Succeeding installments will appear in this section each month until completed. (See Page 386 of the July issue for panel personnel.)

pansion and contraction strains. No gasketing material is elastic enough to follow the flanges during these cycles.

Take up bolts evenly, moving to the bolt diametrically opposite, never to the bolt adjacent.

Follow up bolts the next day after installing new gaskets. For lines carrying high pressures, the gradual building up of the pressure and continuous follow-up of bolts is recommended.

Exercise great care when using gasketing dopes. Never use oil or grease on a rubber compounded gasket. Graphite with glycerine or molasses compounds are not injurious to rubber. Never use dope on both sides of gasket—it may cause slippage or blowout.

Do not use a heavier sheet packing than is necessary. The thinner the gasketing material, the better.

Ring gaskets are preferable to full face gaskets where the flanges are heavy enough to prevent distortion.

*The Relation of Service Life of Packings to Plant Maintenance*—All packing installations have a definite economic length of service or performance. If the service of the packing is extended beyond this economic life, damage may occur to the equipment due to excessive friction or scoring. Also, economic loss may result from excessive leakage.

One of the largest process industries has done an outstanding job in determining the economic life of packings. This has been accomplished by having their laboratory technicians and operating men investigate all phases of operation and then make certain that the packings to be used are suited to the existing conditions.

Complete service records are kept on all new packing applications for a relatively long period. From these records the economic life of the packing service or performance is decided. Based on the economic life a rigid schedule is set up for periodic changes of packings. Much has been gained in increased production, in saving labor and materials by following this practice.

## INSULATION ON PIPES AND FLAT SURFACES

Make certain that the insulation fits snugly around the pipe. Loose pipe covering causes joints to open thereby increasing heat loss and is more easily damaged by impact.

Protect pipe lines exposed to the elements with a properly applied waterproof jacket. This also applies to interior lines which may be exposed to splashing from process water or other forms of wetting.

Thoroughly seal insulation against moisture penetration on pipe lines carrying low side refrigerant or cold water. This requires a more thorough protection than weather or waterproofing.

Examine regularly all waterproofed lines to be sure that no cracks or openings have developed. Wetting causes loss of efficiency and deterioration of insulation.

Replace all covering as carefully as though it were a new installation, when pipe repairs are made. Improperly applied covering cannot do a good insulating job and is more liable to failure.

Protect insulated lines exposed to either

**In Glynn County,** Georgia, they load sawlogs by the "cross haul" method. Tops of sawlog trees and trees too small for sawlogs go to the pulp mills.

Smallest paper machine in the State is the experimental Fourdrinier at the Herty Foundation Laboratory—trim 26 inches.

Your felt requirements whether narrow or wide will fulfill your specifications exactly—made by

***Draper Brothers Co.***

*Draper Felts Favor Efficiency*

**DRAPER BROTHERS COMPANY**

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OUR REPRESENTATIVES *to serve you*

L. H. BREYFOGLE, Kalamazoo, Mich.
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O. J. LELOFF, Vancouver, Wash.

strong alkali or acid fumes by applying a jacket which will resist these fumes. Such fumes may easily destroy canvas and holding wires or bands and allow the covering to fall from the pipes. Under some conditions acid fumes may actually attack the insulating material.

Eliminate or minimize excessive vibration in pipe lines as it may cause joints to open or otherwise reduce the efficiency of the insulation.

Signs of failure in canvas coverings are oftentimes due to the pipe covering loosening from the pipe. In such instances the covering should be carefully wired back into place; joints painted up with asbestos cement. Replace and paint the canvas. If canvas is not available apply asphalt saturated felt jackets carefully wired and cement the laps and joints with lap cement.

Look for inefficient or insufficient insulation as a possible cause of serious water hammer in steam lines. After the hammer has been removed, examine all pipe covering for damage. The impact of the water hammer may open joints in the covering.

Stop leaks in either steam or hot water lines as soon as possible. Steam impinging on pipe covering may cause rapid deterioration. Water from a leak may follow along a pipe for a considerable distance, saturating the covering thus destroying all insulating value and at times even causing the insulation to fall from the pipe.

Do not load insulated pipe lines in any manner, such as erecting scaffolds, etc. Even though the covering is not destroyed it may be permanently distorted and thus have its air space structure ruined, materially reducing its efficiency.

| Unit Losses and Savings Equipment | Area (Sq. Ft.) | P.S.I. (lb.) | Insulation Thickness (In.) | Yearly Steam Loss | | Yearly Savings Insulated Surface (lb.) |
|---|---|---|---|---|---|---|
| | | | | Bare Surface (lb.) | Insulated Surface (lb.) | |
| 10 in. Std. Flange Coupling | 3.4 | 150 | 2 | 23,550 | 1,770 | 21,780 |
| 2 Boiler Drum Heads | 15. | 150 | 2 | 104,000 | 6,700 | 97,300 |
| 1 ft.-4 in. Steam Line | 1.2 | 125 | 1½ | 7,760 | 850 | 6,910 |
| 1 ft.-6 in. Steam Line | 1.7 | 50 | 1½ | 7,910 | 850 | 7,060 |
| 1 ft.-8 in. Exhaust Steam | 2.2 | 25 | 1½ | 8,250 | 900 | 7,350 |
| 100 sq. ft. Flat Steam Surface | 100. | 150 | 2 | 742,000 | 47,000 | 695,000 |
| 100 sq. ft. Flat Steam Surface | 100. | 50 | 1½ | 465,000 | 42,000 | 423,000 |

The insulating efficiency of air spaces may be convincingly proved by sitting on a pipe insulated with a resilient insulation and carrying a high temperature steam. This will truly be found to be an effective "hot seat."

Avoid using soft fibrous materials as they are subject to serious damage.

Grind and mix broken pieces of magnesia pipe covering or blocks with water for use as a patching cement. This is one means of reducing waste. However, the cement will not compare in efficiency with the original material.

Do not use insulating cement in place of blocks or pipe covering as it is not as efficient. Insulating cement is only recommended for irregular surfaces where it is not practical to apply formed materials.

Flat insulated surfaces—the general observations above relative to conserving the efficiency of insulating materials for pipe lines apply as well as to flat surfaces.

Shown above are examples of unit losses and savings made by insulations—Equipment operated 24 hours each day for 309 days in a still air temperature of 75 Fahr.

## COMPOSITION ROOFING AND FLASHING

Inspect roof deck periodically observing warping, loosening and cracking of components, performing suitable repairs before damage has been transmitted to the roofing thereby.

Properly maintain copings, parapet walls and other masonry to avoid infiltration of water.

Protect areas which are subject to frequent traffic with wood walk-ways or similar means. This refers, for example, to


HOW OAKITE CLEANING HELPS MILLS ECONOMIZE ON MAINTENANCE!

DE-SCALE AMMONIA CONDENSERS THIS SAFE, THOROUGH WAY

When you de-scale your ammonia condensers, two considerations come first . . . THOROUGHNESS and SAFETY! All lime-scale and rust deposits must be removed. The job must be done without harming equipment.

On both points, Oakite Compound No. 32 will meet your most critical requirements. Beyond that, it will help you do this work EASIER and FASTER. Full heat transfer efficiency will be speedily restored and head pressure reduced to normal.

FREE 24-page booklet gives details . . . also tells how to use this superior material for effectively, safely de-scaling such other equipment as evaporators, vacuum pumps, Diesel cooling systems and heat exchangers. Write for YOUR copy today!

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THE MOST ECONOMICAL FILLING THAT CAN BE PUT IN A MORTISE WHEEL
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WE MAKE ANY STYLE OR SIZE WANTED
WRITE FOR INSTRUCTION SHEET "O" WHICH IS FREE

QUICK SERVICE ON ALL SIZES
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CARTHAGE MACHINE CO.
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*Machinery for Ground Wood and Chemical Pulp Mills.*

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NEENAH, WISCONSIN
*Builders of*
Paper Making Rolls and Special Machinery
Roll Grinding a Specialty

areas traversed periodically by window cleaners, etc.

Keep roof drains unobstructed—free from accumulations of refuse and, if possible, free of snow and ice.

Make sure that the roof and flashings are kept clear of accumulations of dirt and refuse.

Provide protection for roof areas which are liable to be subjected to condensate and droppings from exhausts where such may contain materials injurious to the roofing and flashing (for example), oils, etc.

Avoid nailing through or otherwise damaging the roofing when installing signs, guy wires, foot walks, lines of piping, etc. Perform all such connections under the supervision of a roofer, following established roofing practice.

Do not store materials on the roof. Where unavoidable, support loads on sleepers, properly secured against movement, avoiding concentrated loads, cutting edges, etc.

Apply a coating of roof putty or other protective coating as a maintenance measure on metals constituting fasteners which are not dependably rust-proofed.

Note condition frequently of roof coverings which are finished with mineral granules such as slag, gravel, slate, etc., to see that such protective covering has not become displaced. Areas found bare or deficiently coated should be recovered with suitable materials.

Inspect roofing and flashing during wind storms to observe action under that force, particularly at roof edges, laps, etc. Fixing loosened covering through suitable and immediate repair will frequently prevent serious blow-off damage.

Caution persons traversing a roof to exercise great care when approaching the angle at parapets and other vertical surfaces so as to guard against their breaking the flashing with the toes of their shoes.

In traversing corrugated asbestos and cement sheeting, use chicken ladders or other walk-ways or require workmen to step over line of purlins only, with extreme care to avoid subjecting this material to impact loads. It becomes extremely slippery when wet and loses some strength.

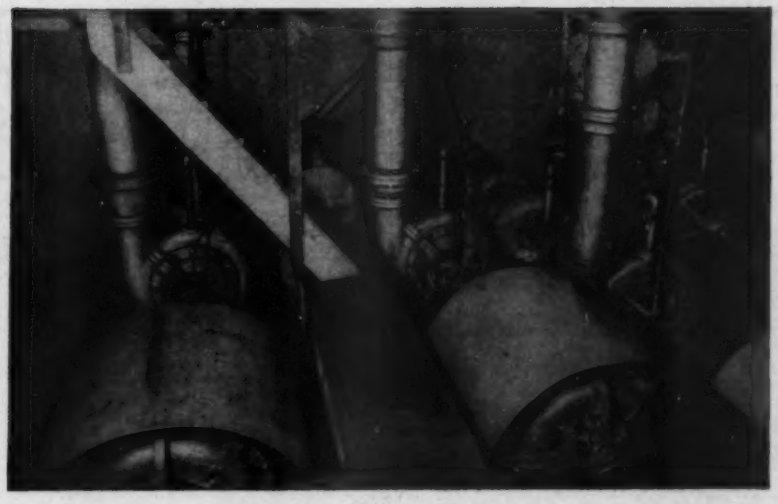
Inspect fastenings of corrugated sheeting, particularly where exposed to corrosive fumes. Disclosure of advanced corrosion, followed by immediate replacement, may prevent serious blow-off damage.

Check frequently, ready-to-lay coverings secured by exposed nailing, to see that such nailing has not worked loose, become drawn, etc. Renail where necessary, filling holes left by removal of original fasteners with roof putty.

Exercise particular care in the removal of snow and ice to avoid damage to the roofing and flashing through cutting action of the implements employed.

Protect areas where roofing and flashing are vulnerable to damage from falling accumulations of ice and snow, by covering with wood planking to receive the impact or provide snow guards or similar means to arrest slide at point of origin.

Make a practice of having a thorough inspection made periodically by a roofing authority, repairing immediately all defects so disclosed.

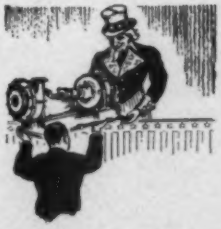



"No pump can handle that stuff"
*but the MORRIS Pumps did*

The foreman was naturally skeptical. Other pumps had been tried on the thick heavy pulp. All of them failed, either because of clogging, or air-binding, or dehydration.

Finally a Morris ST-P Stock Pump was put on the job. The results were so satisfactory that the trial installation was soon followed by many more . . . all of them thoroughly successful.

For complete information on the Morris ST-P Stock Pump . . . the pump that's GUARANTEED not to air-bind . . . write for descriptive bulletin.

WE HAVE ENLISTED  "FOR THE DURATION"

*We have placed at the disposal of the Government all our facilities that might be of use in the national war effort. But our remaining facilities are at your service, and also the advice of our engineers to help you secure best results from your present equipment and to plan for your future needs.*

MORRIS MACHINE WORKS — MORRIS ESTABLISHED 1864 — BALDWINSVILLE NEW YORK

CENTRIFUGAL PUMPS

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## A SHEAR CUT OR A SCORE CUT SLITTER?

Let Cameron answer that problem for you. Because we make *both* shear cut and score cut slitting machines. Cameron engineers can help you to make an unbiased selection. At the same time we can recommend the correct winding method for your job. Write for interesting literature.

CAMERON MACHINE COMPANY, 61 Poplar Street, Brooklyn, New York


Insulated roofing, because of the yielding sub-base of insulation, requires greater protection against damage from mechanical abrasion, traffic, etc., than ordinary roofs. Leakage may spread quickly over a considerable area, reducing effectiveness of insulation. Repairs must be made promptly.

Air circulation under an insulated roof must be controlled. If air under the roof deck is saturated, cold air from the outside striking the underside of the deck may cause condensation.

### REFRACTORY BONDING MORTARS AND CASTABLES

The selection and application of the proper bonding mortar is highly important. Mortars carelessly applied may cause premature failure of the masonry.

Mix dry cements thoroughly with clean, fresh water. Bricks vary in porosity and the consistency of the mortar must be adjusted by trial. Before applying any cement or mortar, the brick should be cleaned of all dirt or foreign material.

Wash coat finished masonry with a thin application of refractory mortar. Open joints and rough brick texture give clinkers a good hold and in removing them, brick are often pulled out. Adherence of clinkers can be controlled by making surfaces smooth with wash coating.

Protect against the erosive action of oil flames and the slagging of brick by molten ash by following these practices:

a. provide settings with tightly sealed joints.

b. make certain that all brick pores are filled by the wash coat.

This protection tends to prevent brick disintegration caused by the action of furnace gases.

Apply wash coating mixtures to the surface of the brickwork with a stiff brush or broom, working it well into the cracks or pores in the brick. It is important to apply the mixture thinly to prevent flaking.

Introduce heat slowly to new settings. Fast firing will develop steam pressure from the moisture in the brick and cement and will disrupt the bond.

Patching worn parts of settings, retorts and furnaces is necessary to assure obtaining maximum life from refractories. The surface to be repaired should be thoroughly scarified—loose particles and dust removed before the patching material is applied.

Various types and grades of patching materials are produced for different services. Heavy patching material cannot be satisfactorily used for shallow, hot patching conditions.

Avoid delays in obtaining prefired shapes. Castable refractories that can be mixed with water and cast or tamped in any desired form or shape are available. After 24 hours of air curing can be put into service.

Castable refractories make possible the easy construction of small monolithic furnaces, door linings, baffle tile, furnace hearths, covers and special shapes of all descriptions.

Castables are handled like ordinary concrete—the amount of water for mixing to obtain the correct installation is specified by the producer.

### BRAKE LININGS

The capacity of any clutch or brake is its ability to dissipate heat. Heat is best disposed of by convection—take every possible means of increasing air flow around clutches and brakes to get rid of heat.

Guard against high temperature in brakes or clutches as it may cause:

(a) wide variation in friction
(b) rapid wear of friction material
(c) possible scoring of metal surface
(d) possible heat checking of metal surface
(e) failure of bearings

Do not use oil, clay or other foreign substances on friction material surfaces in order to control friction. Widely fluctuating brake action will result and probably necessitate lining replacement.

Be sure brakes and clutches are properly adjusted. Unequal adjustment causes unequal wear and noisy operation.

True up badly scored or heat-checked rims with whetstone if portable grinders or other equipment are not available. Rims in this condition can cause rapid wear of friction materials.

Check bands for being out of round or kinked when relining. Such troubles create local high pressure areas, rapid wear, excessive heating, noisy operation, and short life.

Bear in mind that increasing the width of a brake does not increase its braking capacity. It simply reduces unit pressure and the brake lining lasts longer.

Greater brake capacity can be provided by increasing diameters or torque arm, or total pressure.

## Maintenance of Mechanical Power Equipment

**(Compiled by Maintenance of Mechanical Power Plant and Power Transmission Equipment. Chairman—Alfred Iddles, Babcock & Wilcox Co.)**

On your list of "musts" in paper mill maintenance, you will check, and probably double check, the power plant, because, when it is in trouble, so is your whole mill.

As paper mill executives, you will want to know whether or not your policy toward your power plant is correct for the dependence which you place on it, and for what you require of it. These are trying times for any executive in charge of the production of goods. They are likewise putting to the test the man in charge of your power plant and the various operating and maintenance personnel under him, Extra loads, varying fuels, loss of skilled workmen, shortage of maintenance materials are only some of the difficulties that beset power plant operators at the present time. Such difficulties, however, if not wisely met, can quite easily develop consequences that may be disastrous to your mill production schedules.

In the brief time at my disposal I shall try to present some of the more important items in power plant maintenance, and if what I say causes you to check up on one or more of them on your return to your respective mills I feel that this period will have been worth while.

I shall assume that your chief desire is to so maintain and operate your power plant that it will perform as it was intended to perform, that scheduled outages for inspection and overhaul are preferable to unscheduled outages or breakdowns, and that maintenance costs and thermal efficiencies are important, but secondary to continuity of service.

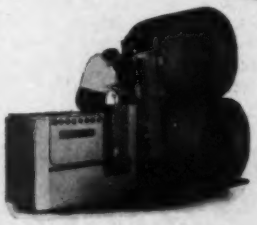
Aside from everyday maintenance, such as renewal of packing, grinding of valve seats and like items, most boiler-room repairs are caused by scale in boiler tubes, resulting in burned or bagged tubes; deposits of carryover in superheater tubes, resulting in overheating and failure; and the failure of boiler, economizer, or superheater tubes due to cutting on the outside of improperly adjusted soot blowers. In addition, with economizers there is the problem of tube corrosion on the inside, due to oxygen, and on the outside, due to improper feedwater temperatures, aggravated by high sulphur content in the fuel, which results in moisture condensed from the flue gases combining with burned sulphur to produce sulphuric acid and, frequently, very bad corrosion.

### BOILER REPAIRS

Practically any failed tube can be repaired by welding in a new section.—In the last few years, the art of welding, both in the technical metallurgical questions involved and also in the available skill needed for such practice, has developed greatly, and today it is entirely feasible to make the majority of repairs to failed tubes by this method. The usual procedure is to cut out that portion of the tube which has failed, and adjacent portions which are damaged;


# *Mercury Fork Truck does Triple Duty

*for this large Michigan Paper Manufacturer*



1

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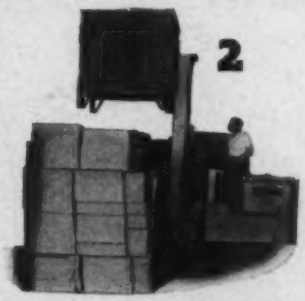
Mercury Fork Trucks are fully described in Bulletin-210. Request your copy.



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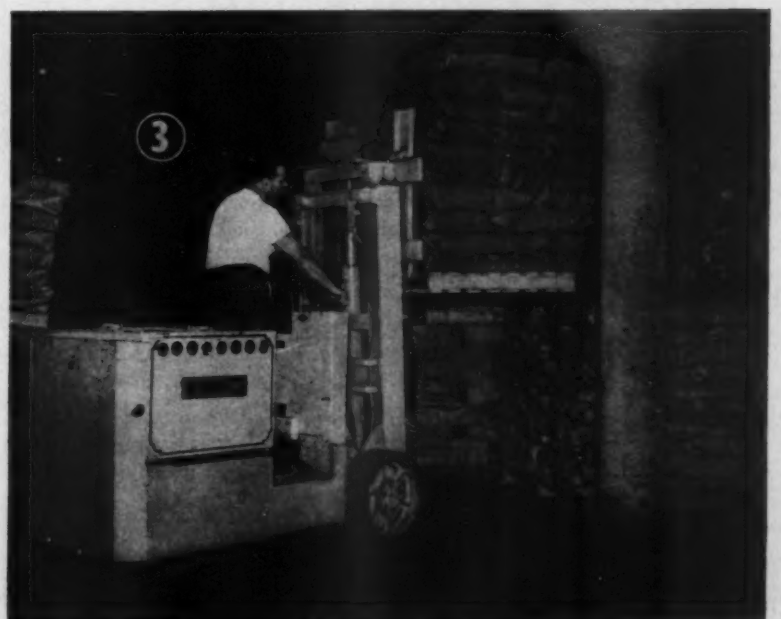

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to machine the end of the tubes for the proper welding groove; to place a backup ring on the inside of the tube at the weld; and then to make the weld in place. Sometimes it is necessary to bend tubes out of a wall or out of a bank of adjacent superheater tubes, to obtain physical access, but, in the vast majority of cases, the weld can be made in place without removing other tubes, or, at most, as in some cases, by the cutting out and, later, welding any one or two tubes that may be interfering with access to the damaged spot.

Employ a qualified welder—the best obtainable.— It is important that this work be done by a qualified welder, who may be developed on the job from a skilled mechanic on the paper mill payroll. In many cases work around the plant justifies the retention of such skilled welder. For plants where this is not feasible, arrangements should be made at the most convenient source for the use of a qualified worker for emergency repair work.

The word "qualified" is used in the limited sense, because, to meet code and state inspection requirements, it is necessary to have a welder who has proved his ability by meeting a standardized set of tests. These tests are repeated periodically and, if successfully met, the welder may continue to be classed as a "qualified" welder.

Stock some straight lengths of tubes of every diameter and thickness in your boiler unit.— In order to use this time-saving method of making tube repairs, it is necessary to have on hand spare lengths of straight tube of the various sizes and thicknesses employed, not only in the boiler, but in the superheater and economizer, if installed. These spares should be properly protected, for immediate use.

Have available a suitable tool for machining tube ends preparatory to welding.— The forming of the welding groove at the tube ends should be a simple matter, as practically all mills have some form of machine shop. It may be necessary, however, to obtain a special tool for this purpose.

Obtain a supply of backing-up rings for butt welds in tubes.—As with the spare tubes, the supply of backing-up rings should include sizes suitable for every diameter and thickness of tube in the unit.

Become familiar with the "Rules for Repairs by Fusion Welding to Power Boilers" as recommended by the National Board of Boiler and Pressure Vessel Inspectors.— This method of repair has become universally acceptable, except in a few isolated districts, and the management should learn, through its insurance company, what the local rules are. Information along this line may be obtained from the "Rules for Repairs by Fusion Welding to Power Boilers," published by the National Board of Boiler and Pressure Vessel Inspectors. Your local insurance or State inspector can furnish you with a copy (or it may be obtained from C. O. Myers, Secretary-Treasurer, Room 1105, 145 N. High St., Columbus, Ohio) and should be consulted in connection with your general preparations for this method of repair. He also will desire to inspect the repair while it is in progress, and to pass upon it before the boiler is placed in service.

## FEEDWATER AND BOILER SCALE

Hire a chemist, or arrange for a feedwater consultant.—In every plant of any size, the feedwater problem can best be supervised by a consulting specialist or by a properly qualified chemist who will spend part of his time in the boiler room, and not be restricted to laboratory work. He should know the conditions resulting from his chemical treatment, and he can only do this by personal inspection. Needless to say, he should have authority commensurate with his responsibilities.

Keep oil, organic matter and waste chemicals out of the boiler.—Oil, if permitted to contaminate the boiler feed, will deposit on the heating surfaces and act as an insulator, resulting in damage to the tubes. Sometimes it is most insidious, and difficult to prevent and determine by inspection. The gauge glasses should be watched, for oil on top of the water, and all boiler internal surfaces should be inspected at every outage, for evidence of oil. Deposits of oil and organic matter can be prevented by proper selection of feedwater source, and by segregation of returns from condensing apparatus.

Another big bugaboo in boiler operation is internal corrosion, which may result either from oxygen entrained in the feedwater, improper boiler water alkalinity, and sometimes from waste chemicals prevalent

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around a paper plant, which, if permitted to contaminate the boiler feed, are likely to cause trouble. Oxygen can be prevented by the standardized and readily available deaerating feed-heaters. These heaters, however, will not remove the oxygen unless they are operated at the proper temperature and are properly vented. Precautions should be taken to see that proper alkalinity is maintained and that no waste chemicals can contaminate the feedwater.

Check boiler water condition—total dissolved solids—hardness—oxygen content—every day, preferably three times a day.—The condition of the water going to the boiler, and the water in the boiler, should be checked at least once every day—in some plants, three to six times per day, as may be considered advisable. The quantity of blowdown needed to maintain at an acceptable figure the total dissolved solids in the boiler water, should be known. To make certain that no hardness is present in the boiler water to form scale, the water must be checked, and tests must also be made for alkalinity and *p*H value, as well as oxygen content, to make certain that no corrosion is lurking around the corner.

Boiler tubes in modern boilers will not live with scale on the inside.—There are many, many people who are not sufficiently aware of the damage that can result from scale. This is especially true with modern boilers, where high rates of heat input are common practice, in order to obtain a greater capacity for a given size of boiler. Likewise, the desire for overload operation in these times augments this difficulty. Every person involved throughout the entire plant should therefore become conscious of the fact that scale, under these conditions, will cause boiler tube failures. These usually occur without notice, and are particularly disturbing to production schedules.

Scale can be prevented by proper treatment of the feedwater, or, in some cases, the water inside the boiler. If the proportion of feedwater makeup is high, then it must be treated to remove as much of the scale-forming material as possible before entering the boiler. The common methods for doing this are lime soda, hot or cold, or zeolite. For plants requiring proportionately low makeup, phosphate treatment in the boiler drums will prevent scale forming from small amounts of hardness coming from condenser leakage or other source.

Turbine tubes periodically, if scale is present. Inspect for scale by turbining sample tubes.—With the foregoing precautions, nevertheless, it sometimes happens that scale does form. At every outage, therefore, some selected tubes in the boiler should be turbined, as samples, to see if scale has formed. If it has, it must be removed. To do this, it is necessary to have sufficiently powerful tube cleaners, and proper equipment to use them economically. To simply run a cleaner through a tube means little, unless inspection shows that scale has actually been removed.

Keep your tube cleaners in good condition, and have ample spare parts.—It is, of course, important that cleaning tools be carefully handled, and maintained in proper working condition, and that an ample supply of spare parts be on hand at all times.


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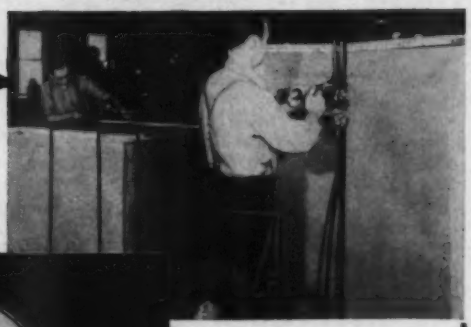

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## BURNERS

Obtain priority and secure spare burner parts, such as tips.—Because burners are exposed to furnace heat, replacements are inevitable. The records of the plant should show the particular parts that need replacement, and spares for such parts should always be on hand. Today this is of vital importance, because of the necessity of obtaining priorities, and the possibility of delay in securing needed parts. If a situation should arise that necessitates the use of substitute materials, care should be taken that the material from which the items are made will stand up under the extreme temperatures to which they will be subjected.

Inspect burner parts exposed to furnace heat at every outage.—If your plant uses gas, oil or pulverized coal, then there are burner parts exposed to radiant heat. If any of the burners are idle at times, these parts may be oxidized and gradually deteriorate. Sometimes burners are arranged for air cooling. Routine of operation should see that such air cooling is provided, if needed.

Save fuel by inspecting fires for incomplete atomization of coarse coal.—If your boilers are fired by oil, the atomizing tips will need frequent cleaning. A worn-out tip, as well as incorrect oil pressures and improper oil heating, will result in poor atomization and inefficient operation, accompanied many times by undesirable smoke.

To minimize maintenance, set up suitable cleaning jigs and tools, which are simple and cheap, adjacent to the boiler, so that the operator can properly clean and reassemble his burner tips and atomizing discs. He, of course, will have spare ones for use while he is working on the others.

With pulverized-coal firing, a great deal can be learned concerning the proper adjustment of the burners, by observation of the burner performance. If there are sparklers in the flame, then the fineness of pulverization should be investigated. If the shape of the flame is not correct, then damage to furnace walls will result. If adjusted incorrectly in the opposite direction, then smoke is likely to result.

If your plant burns natural gas, your problems are simplified, except that it is more difficult to judge the efficiency by observation.

If you are burning any of these fuels—oil, pulverized coal, or gas—a rigid and carefully considered routine for starting and stopping must be established, if explosions and resulting outages are to be prevented. If this has not been done, then the safety devices, including interlocks, should be checked at once, and a routine for manual operation should be established.

Check burner performance with an orsat at least once a day.—Many plants have an orsat alongside the boiler, and the operator makes daily checks to determine the quantity of excess air. By so doing, he has a measure of his dry gas loss up the chimney.

## PULVERIZERS—STOKERS

Wear, overheating, or both, inevitably cause need for replacement.—All pulverizers are subject to wear. Such wear requires adjustment to re-establish suitable clearances and relief between parts, to maintain proper fineness of the finished product. Therefore, pulverizers should be checked periodically.

Get priorities and needed spare parts as indicated by your history of previous repairs and replacement.—Many people keep a record of wear by measurement or by the use of casts of plaster of paris, thus establishing a rate of wear for a known kind of coal, and are thereby enabled to estimate the time when replacement parts should be installed. Be sure that such spare parts are on hand, and that adjustments are made frequently, in order to maintain utmost efficiency resulting from fine coal. If your source of coal varies widely, then adjustments are frequently necessary for the different fuels. It makes a great deal of difference whether the grindability is 40 or 90. The quantity of primary air bears a relation to grindability and to burner performance, and the means for its measurement and check should be available.

Prepare stoker fuel beds before banking, so that grates will not be overheated; that is, the banking of hot fires is questionable.—If your plant has stokers, improved operation will result from proper sizing of the coal and from its introduction to the stoker hoppers in such manner that segregation between fine and coarse coal will not occur across the width of the stoker. If you are using chain-grate stokers with certain types of fuel, then you should be able to determine by experience what degree of tempering is needed, and to apply this knowledge in order to secure the most efficient operation. The coal sizing, prevention of segregation, and proper tempering, will have much to do with maintenance of stoker parts.

If your load cycle requires banking periods, then attention should be paid to proper conditioning of fuel bed ahead of the banking period. A uniform fuel bed not recently at its maximum rate of combustion will go into a bank with much less chance of damage to the metal parts of the stoker grate than would be the case if such conditions are not provided.

Be sure that proper draft is maintained at all times.—The maintenance of the proper draft, either through the grates, if it is chain grate, or over the fire, if an underfeed stoker, will go a long way towards minimizing the amount of damage to the stoker from overheating resulting from heavy loads and long periods without inspection.

## GENERAL

The basis of all maintenance is systematic thorough inspection. Make sure that you have it.—There are a few operators, who, down in their hearts, do not realize that systematic maintenance and inspection is preferable to hasty repairs made after unscheduled outages are forced by unexpected failure of equipment.

To make such systematic inspection, it is necessary to have a well-planned schedule for outages, and an arrangement of man power at the needed periods, so that such inspection and indicated maintenance can be done with the minimum of lost time.

All maintenance is either routine, emergency or miscellaneous. Bear heavy on the first and last, to keep down the emergency maintenance.—Many plants train their mill maintenance force for power plant work,


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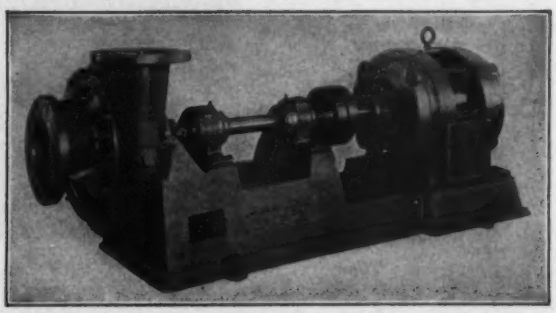

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and can throw into the power plant, for two or three days, a large number of men to do required maintenance with a minimum of outage. It is particularly desirable to so arrange the work that the boiler plant will not have to be placed back into operation on a Sunday night with incompleted repair work. One frequently hears the remark that this or that was not done because the plant had to go back into service. Perhaps this was so, but, if it was, it was an indication of an absence of sufficient planning and provision for man power, or possibly the lack of adequate material, which last might have been foreseen by maintaining a well-thought-out storeroom with spare parts for all reasonable contingencies.

The paper-mill superintendent should not try to run the power plant—unless he is willing to accept responsibility for outages. I have known plants where the paper-mill superintendent dictated the operation of the power plant. If this is the case in your organization, then be sure that the mill superintendent also assumes responsibility for power-plant maintenance and operation. If there is a superintendent of the power plant, independent from the mill superintendent, then they must co-operate in scheduling that rate of production which will balance between maintenance and outage in the power plant and production and outage in the mill. It is impossible for the mill superintendent to demand operation of the power plant, and, simultaneously, expect the power-plant superintendent to be responsible for its outage and maintenance, let alone efficiency.

Your power-plant engineer should know the limitations of his equipment, or take immediate steps to learn them.—All power-producing equipment has limitations, these varying with equipment and its present condition. These limitations are undoubtedly well known to your power-plant executive. They should also be recognized by the other mill executives. The chief can know this better, if he has proper records to show past maintenance work and load conditions. From this he can more readily determine what may be expected in the future, with the potential load that he faces.

Frequent reference has been made to spare parts. These have always been necessary, and frequently neglected, but in these times are vital. Materials are not available in most cases, except under Government priority regulations. These limitations must be constantly watched, and every effort made to build up a reasonable store of necessary materials, as well as to know what routine to follow in obtaining priorities for emergency conditions.

Power plant equipment transforms large quantities of energy. Its operators are playing with fire, literally and figuratively.—All parts of a paper mill depend upon the power plant. The need for steam and power is imperative. The power plant and its operating personnel are using a considerable amount of valuable raw material, and outage there means loss of production in the mill. It seems obvious, therefore, that the power plant should be provided with an adequate organization which knows its equipment limitations, or can determine them from time to time. If you do not have such an organization, you probably would save money by providing one.

The essence of management is planning. The efficiency and continuity of service obtainable from a power plant is very largely influenced by the feeling existing throughout the organization, and the quality of the supervision it gets from the management of the mill.

# Convention Papers . . . Abridged

## Colloidal Properties of Aqueous Dispersions of Titanium Dioxide*

S. W. MARTIN
Research Laboratory, Titanium Division, National Lead Company

To demonstrate composition-structural relationships, titanium dioxide pigments were selected as representative of the high opacity type of filler. Even with this definite limitation in subject, the fundamental nature of aqueous dispersions of even one filler involves a wide variety of colloidal topics and it will hardly be possible to treat each to the extent that might be desired. Instead an attempt will be made to develop a panoramic picture of the significant variables inherent in an aqueous dispersion of titanium dioxide.

Commercial titanium dioxides used by the paper manufacturer analyze about 99 per cent $TiO_2$. The impurities are inorganic and vary somewhat with the process of manufacture, treatments, etc. The two industrially important forms of titanium dioxide are the anatase and rutile crystalline modifications. In the following, the discussion will be restricted to the water dispersible (WD) anatase grade of commercial titanium dioxide since at present this product is used chiefly by the paper manufacturer.

Filler particles have an internal structure the nature of which has been ascertained from X-ray investigations of solids. It is known that the characteristic, aggregate particles consist of elementary building bricks arranged in accordance with a definite architectural plan. The bricks themselves are roughly of atomic dimensions. In the case of titanium dioxide pigments, X-ray analysis has revealed a very firm bonding of the building bricks and a dense interior that is impervious to the dispersion medium. A study of the colloidal properties of such a material logically leads one to the exterior of suspensoid particles. These range from about 0.1 micron to a few microns in diameter (1 micron $= 10^{-4}$ cm.).

Outstanding opacity, which characterizes a titanium dioxide pigment, results when its high index of refraction is coupled in the process of manufacture with an optimum particle size. The latter is fixed by the wavelength values of ordinary light within a range whose extremes are given by 0.1 and 0.5 micron. Then also, pigment type materials dispersed in a liquid by more or less practical methods are generally polydispersed which signifies a variety of particle sizes. The measurement of particle size, as a result, assumes considerable industrial significance. It is of interest to review briefly some of the methods which are suited for the determination of subsieve particle sizes.

The microscopic method is well known and has been described by Chamot and Mason (Chamot, E. M., and Mason, C. W. *Handbook of Chemical Microscopy*, Vol. 1, second ed.), in considerable detail. Dunn (Dunn, E. J., "Microscopic Measurements for the Determination of Particle Size of Pigments and Powders," *Ind. Eng. Chem.*, anal. ed. 2:59, 1930) developed a microprojection technique which is particularly well suited to the measurement of the size frequencies of pigment-type materials. The procedure is also the basis of a tentative method of the American Society for Testing Materials ("Tentative Method of Test for Particle Size Distribution of Subsieve Size Particulate Substances," *A.S.T.M. Standard*, Part II, p. 1164, 1939). The results, however, are subject to a number of limitations (Gamble, D. L., and Barnett, C. E. "Scattering in the Near Infrared. A Measure of Particle Size and Size Distributions," *Ind. Eng. Chem.*, anal. ed. 9:310, 1937): "(1) To obtain a satisfactory field for projection

(*) Modified slightly by author to improve continuity of abridgment of original paper.

**This is the sixth installment of abridgments of papers presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, held in New York City, February 16-19, 1942. Previous installments have appeared consecutively in the March, April, May June, and July issues, and will be continued in succeeding issues.**

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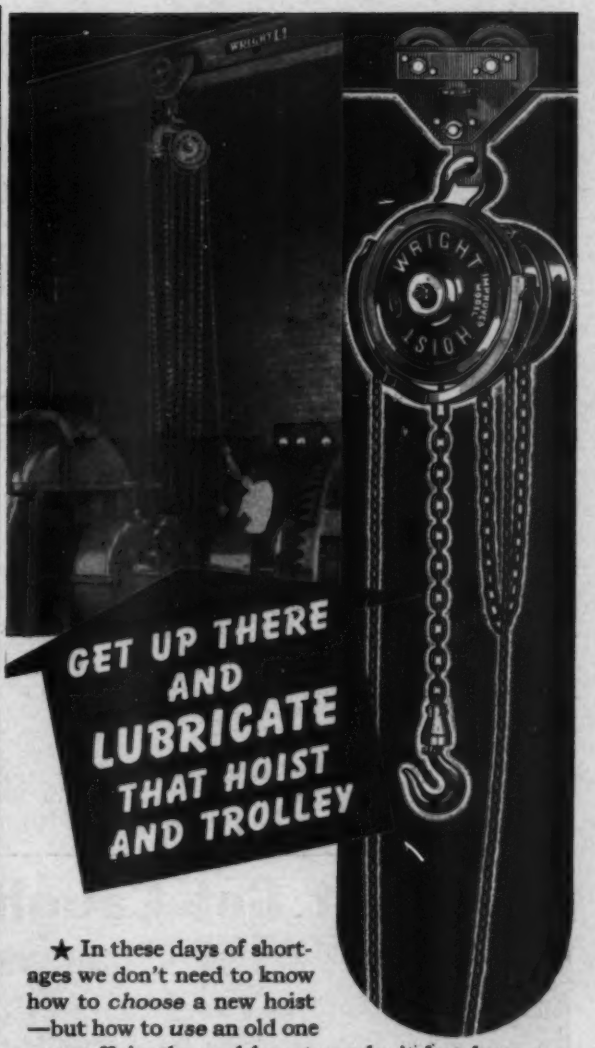


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If your hoist is under constant use, as on assembly line work, inspect and lubricate it every month. If it is subjected to ordinary occasional service, then perhaps lubrication every three months and inspection every six months is sufficient. But keep your load chain well lubricated at all times. A lubricated chain will *far* outlast a dry chain.

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or photography, the mount should not be more than a few particles thick. (2) In the case of non-uniform materials, difficulty is experienced in bringing both coarse and fine particles into focus at the same time." Aside from these, the useful magnification of the microscope employing visible or ultraviolet light imposes a limiting value of a few tenths micron on the microscopic resolution of fine particles.

After several years of development the electron microscope has emerged from a scientific curiosity into a research tool in which the image is produced by a stream of electrons passing through the specimen. The principles embodied in the electron microscope are closely analogous to those of the microscope. Among the unique features is a high resolving power due to the extremely short wavelengths obtainable with an electron beam. The instrument, its application, etc., were recently submitted to an excellent analysis by Barnes and Burton (Barnes, R. B., and Burton, C. J. "The Electron Microscope and Its Uses," *A.S.T.M. Bulletin* No. 116:34, 1942).

For very fine particles it was possible to overcome the limiting resolution of the ordinary microscope by taking advantage of the extremely small wavelengths of an electron beam. In a somewhat analogous manner, the gravitational resolvability of suspended fines may be increased sufficiently to sediment even the smallest colloidal sizes by a proper application of centrifugal force. The sedimentation techniques used to determine the particle size distribution of a pigment in suspension have been described and the factors involved in this determination were considered in some detail by Martin. (Martin, S. W., "The Determination of Subsieve Particle Size Distributions by Sedimentation Methods" in "Symposium on New Methods for Particle Size Determination in the Subsieve Range," *American Society for Testing Materials*, p. 66-89, 1941.)

As an illustration of the results obtainable with centrifugal sedimentation, a particle size distribution for an anatase titanium dioxide (WD) dispersed by high speed agitation in distilled water is given in Table I. The above particle size distribution is equivalent to a surface area of 21.4 square meters per cu. cm. of titanium dioxide pigment the surface mean diameter is calculated equal to 0.28 micron.

*TABLE I*

*Particle Size Distribution of Titanium Dioxide (Water Dispersing Grade)*

| *Size Interval (Micron)* | *Per Cent of Total* |
|---|---|
| Over 1.0 | 1.2 |
| 1.0—0.5 | 6.3 |
| 0.5—0.3 | 41.5 |
| 0.3—0.2 | 35.5 |
| Under 0.2 | 15.5 |

In addition sedimentation methods have been found to offer a number of distinct advantages in the study of solid-liquid dispersions of industrial interest:

1) The effectiveness of dispersion technique, agents, etc., employed to deaggregate or suspend a pigment-type material may be evaluated. To illustrate, the variables of ball mill grinding, high speed agitation, etc., are amenable to particle size distribution analyses. Since practical conditions of dispersion may be simulated, considerable significance may be attached to a correlation of the particle size results with final pigmentation of paper, latex, viscose, etc.

2) A weight distribution is the direct result of a sedimentation procedure. Therefore, the coarse in a given material are readily detected and representative results are obtained without too great an expenditure of time and effort.

3) If it is permissible to sacrifice absolute accuracy in the determination, then rapid procedures for the control of particle size may be outlined. These methods measure accurately the relative degree of fineness of dispersed filler materials.

With a sedimentation technique available the total surface area associated with a given titanium dioxide dispersion is readily ascertained. But in order to account for the final pigmenting properties of such suspensions when used in papermaking, additional variables attributable to the solid-liquid interface have to be investigated. Electrophoretic measurements reveal the particles to be electronegatively charged with respect to the aqueous dispersion medium. In distilled water, the actual mobility of the particle is about 3 microns per sec. per volt per cm. If $Mg^{++}$ or $Ca^{++}$ are added to the dispersion medium, the electronegative charges on the pigment particles are neutralized owing to the adsorption of these polyvalent cations. This adsorption destroys the electrical protective mechanism. The forces of attraction between the particles now exceed those of repulsion, and flocculation of the pigment is the natural consequence. Flocculation may also be brought about by a variety of other methods. For example, if excessive amounts of alkali are added to a titanium dioxide (WD) suspension, the electrophoretic mobility of the particles decreases due to a diminishing potential difference between pigment particle and dispersion medium. A point is finally reached where attraction exceeds the repulsion between the particles and flocculation occurs.

Increasing the solid content of a suspension has a marked influence on the motion of the individual particles in either a gravitational or centrifugal field of force. If the distance of separation is fairly large, the particles are able to move without any noticeable hindrance. This is termed "free settling" and is a necessary condition whenever Stokes' sedimentation formulas are used to determine valid particle sizes. Above a critical value of solid content, the density of population is such that the movements of individual particles become subject to considerable mutual interference. So-called "hindered settling" results whenever such a system is sedimented. Titanium dioxide (WD), dispersed in distilled water and submitted to centrifugal sedimentation, offers an excellent means for confirming the two types of settling. (See "Symposium on New Methods for Particle Size Determinations in the Subsieve Range," page 76, *American Society for Testing Materials*, 1941.)

Above 15 per cent solids by weight centrifugal sedimentation as a measure is both time consuming and an interpretation of its results would also be subject to some


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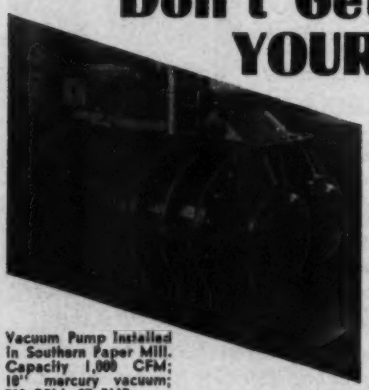

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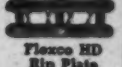
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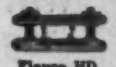
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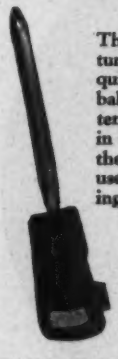

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complexity. In view of this a more suitable measurement is required to bridge "low solids" with "high solids" phenomena of titanium dioxide (WD) suspensions. The determination of the flow characteristics of these suspensions offers a means for evaluating the physical condition of highly pigmented dispersions. A Stormer viscometer was employed to obtain the necessary data on aqueous dispersions prepared by high speed agitation. A concentration range of a few per cent to 75 per cent pigment solids was covered. For each solid content, it was also possible to calculate the average interparticle distance which is also an indication of the amount of liquid within which a particle is free to move without interference from its neighbors.

Calculations showed that there is available a large amount of free, mobile liquid in a suspension of titanium dioxide (WD) providing the concentration is less than 10 per cent solids. As a result, the fluidity of a low solid suspension, as measured with a Stormer, is negligibly different from water. When the distance of separation equals that of the particle diameter, the internal friction arising from the increased number of particles in a given volume of suspension produces a measurable consistency or higher resistance to flow. As the distance of separation continues to diminish to a value of one tenth that of the particle diameter, the consistency experiences a rapid rise. Yet in spite of a close packing of the individual particles, the electrical forces of repulsion are sufficient to exceed those of attraction and a pigmented system with fair mobility and good dispersion results even at 75 per cent solids. From this it is apparent that given a titanium dioxide (WD) suspension which is fluid and well dispersed at high solids, dilution or further separation of the individual particles will tend to minimize the load placed on the stabilizing mechanism. Under such conditions no change occurs in the degree of dispersion in going from high- to low-solids suspensions.

Since the titanium dioxide particle has been carefully tailored to fulfill important pigment specifications, it is neither advantageous nor expedient to alter the interfacial characteristics through its internal structure. A much simpler procedure is to bring about a shift in the equilibrium of forces by predetermined additions to the dispersion medium. Experiments involving hard water and water softeners may be performed to illustrate the possibilities for external control of dispersion or flocculation in aqueous dispersions which are highly pigmented with titanium dioxide (WD).

The dispersed systems considered in the preceding gave consistent reproducible results which are attributed to the following: (1) titanium dioxide pigments are manufactured subject to rigid compositional and physical requirements that characterize large-scale chemical production; (2) the theoretical treatment had only to be concerned with one mineralogical species; and (3) due to the compact interior of the individual particles, the colloidal properties of aqueous dispersions were tied in with simple geometric consideration.

In passing one might note that the clay minerals, i.e., kaolin, montmorrilonite, etc., are representative of another type of filler, the chemical and mineralogical compositions of which are variable and dependent upon the natural source. Coupled with this also are the unique, varied internal as well as external particle structures of clay minerals. The resultant of a multiplicity of composition-structural variables approaches a much higher degree of colloidal complexity than that associated with aqueous dispersions of titanium dioxide.

With increasing usage of high-opacity pigments as beater additions, pigment retention when a fiber-filler furnish is dumped on the screen became the subject of numerous publications. In the case of titanium dioxide pigments, Willets (Willets, W. R., "Beater Addition of Titanium Pigments," *Tech. Assoc. Papers* 17:120-123, 186-188, June, 1934, . . . . Ibid. "Factors Affecting Retention," *Tech. Assoc. Papers* 19:411-416, June, 1936) investigated the factors affecting retention and accumulated considerable experimental data. The difference of opinion regarding the mechanism of retention led Martin and Willets (Martin, S. W., and Willets, W. R., "Retention of Fillers," *Tech. Assoc. Papers* 23:294-300, June, 1940) to an analysis of the data in terms of colloidal information pertaining to the various constituents of the furnish. This publication is cited as an illustration of the utility of fundamentals in arriving at a better understanding of a practical, papermaking problem.

Among the many requirements of a paper coating process, Massey (Massey, P. J., "Paper Machine Coating Process," *Tech. Assoc. Papers* 23:213-16, June, 1939) places considerable emphasis upon the fact that "the viscosity suitable for the process at hand be produced with the minimum amount of water or other vehicle since the smaller the percentage of water to the mix the less you will have to evaporate on the machine." This of necessity introduces aqueous dispersions of fillers with high solid content. Since a specific flow condition is also required for a suitable coating mix, it is evident that a critical balance must be established among the numerous colloidal variables inherent in final coating formulations. In this field especially, colloidal research should play a significant role in future theoretical and practical developments.

**Acknowledgment:** The writer wishes to acknowledge his indebtedness to J. L. Turner, Director of Research, Titanium Division of National Lead Company, and W. R. Willets, of the Titanium Pigment Corporation, for many helpful suggestions and the interest shown during the writing of this paper.

## Water Treatment Developments

WILLIAM R. GIBSON
Manager, Northwest Filter Company

Water is really a highly complex material, which may require one or more of many varieties of treatment to make it satisfactory for process use. Some of the objects desired are as follows:

(a) Removal of suspended matter
(b) Reduction or removal of color

(c) Reduction or removal of dissolved solids and the selective reduction or removal of dissolved solids

(d) Sterilization

(e) The addition of qualities not present in natural water supply, which have been made possible by the development of many wetting agents, dispersives, etc.

Suspended matter has usually been removed by means of slow settling or by filtration through rapid sand filters. In some cases satisfactory water can be obtained by straight filtration without coagulants, but more usually coagulation by means of chemical treatment, has been resorted to, with a settling tank preceding the filters to remove the bulk of the solids by settling. An increasing range of coagulants is available in addition to the widely used filter alum including ferrous sulphate, ferric chloride, sodium aluminate, chlorinated copperas, and ferric sulphate. Clay and other filter aids may be used to some extent.

Treatment for color removal is accomplished by flocculation with coagulants, the coagulated material adsorbing the color which is then settled and filtered out as in the case of suspended matter. In many cases waters which are high in color may be low in total solids and may require the addition of considerable chemicals to provide sufficient floc to adsorb the necessary amount of color from the water. Color is mainly due to the presence of organic matter in the water, but may be caused, or increased by the presence of iron, manganese or copper, or combinations of these metals.

The lime-soda softener is the most common example of means to reduce dissolved solids and is most often used with waters comparatively high in calcium carbonate and in which the addition of lime or lime and soda ash is necessary for the precipitation of substantial amounts of calcium and magnesium.

An example of selective reduction of dissolved solids would be the lime-soda softener equipment when used for the reduction of silica, or some form of zeolite softener where the reduction of dissolved solids can be carried almost to complete elimination by successive treatments, with the one exception, that silica is not reduced.

The commonest form of sterilization is by means of chlorination. The growth of slime bacteria is reduced in piping and equipment. Other forms of bactericides are used for the control of slime conditions.

Chemicals, particularly the wetting agents (mostly sulphonated alcohols) have been used for various purposes, as in felt washing, in the beaters, and in other places throughout the mill, also dispersives of various kinds. These chemicals form an interesting addition to the possibilities of water treatment.

Sodium hexametaphosphate has possibilities which distinguish it from other commercial products.

The fundamental properties of this glassy phosphate are:

(1) It sequesters many metallic ions in the form of soluble complexes.

(2) It exhibits a pronounced dispersive action upon finely divided metal oxides and salts.

(3) It inhibits the crystallization of many slightly soluble salts, stabilizing a condition of supersaturation.

(4) It is distinguished from the orthophosphates and pyrophosphates by its ability to coagulate albumen.

(5) Essentially neutral when first dissolved, it reverts slowly to orthophosphate with a decrease in *p*H value.

The dispersing effect of the compound on clay, titanium oxide, and calcium carbonate is made use of in a number of the coating processes in paper manufacture. The amount of sodium hexametaphosphate required depends on the pigment and type of adhesive used but generally varies from 0.1 to 1.0 per cent on the total weight of solids. It can be used in coatings containing casein as the adhesive, particularly to improve the spreading properties of the coating mix.

A formula has been developed at one of the leading paper colleges which has found wide use in washing felts. This formula consists of sodium hexametaphosphate, sodium metasilicate, and a sulphated fatty alcohol.

In felt washing it is necessary to rapidly and thoroughly impregnate the felt with a detergent solution which will free the loading material and rinse freely in the final rinsing process. When felts are washed on the machine, the felt is saturated with a spray from the perforated pipe across the width of the felt. A 1 per cent solution is made up in a tank overhead, with the felt washing compound. This compound is made up as follows:

42 pounds sodium hexametaphosphate
42 pounds sodium metasilicate
16 pounds igepon, gardinol, or naconel, etc.

The temperature of solution should be between 100 and 120 Fahr. This solution is sprayed on the felt and the felt is run with this solution for 20 minutes. Then the showers are turned on, and the rinse is for 20-30 minutes.

This washing formula puts the felt in a soft and uniformly absorbent condition. It does not have the drawback that a soap compound has, of forming lime soaps, but improves the porosity of the felt. The fibers are kept soft and resilient and a maximum felt life is assured.

We have a third property of sodium hexametaphosphate dealing more with water treatment: this is the property of inhibiting the crystallization of many slightly soluble salts, stabilizing a condition of supersaturation. We commonly refer to this treatment as "threshold treatment." By adding the compound on the order of 1 to 2 ppm to a high bicarbonate water, the deposition of calcium carbonate scale on heating or addition of alkali is inhibited even in waters containing as much as 30-40 grains of hardness. The threshold treatment, with somewhat higher concentrations up to 10 ppm will inhibit the corrosion of iron in pipelines from soft waters. The growth of calcium carbonate crystals from a high bicarbonate solution apparently is inhibited with this compound, by isolating crystal nuclei as rapidly as they form. The formation of a protective film over iron pipelines seems to be responsible for the ability of the compound to inhibit corrosion.

Threshold treatment of water inhibits scale formations in pulp washers, pipelines, vacuum pumps, condensers, heaters, etc. Bleach tanks can be kept more free of scale with the addition of 4-6 ounces of the compound to a 10,000-gallon tank. Alkaline pulp from the caustic extraction coming in contact with a high bicarbonate wash water will deposit scale on the washers. The addition of the compound to the wash water to the extent of a 4 ppm will inhibit this scale deposition.

In the washing of sulphate pulp after digestion, it is necessary to add more than 2 ppm of sodium hexametaphosphate because of the pulp and large amounts of impurities present. When washing pulp with a dilute black liquor wash followed by two hot clear water rinses, the pulp has a certain bleachability. If the compound is

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added to each of the hot clear rinses, 0.05 per cent based on the weight of wood, the chlorine demand is reduced as much as 15 to 25 per cent.

When the compound is used in the wash, it is assumed that it inhibits the precipitation of the coloring matter in the sulphate pulp so that it is more readily washed out. Pulps of higher brightness are produced with a reduction in the amount of chlorine required. Strength values of the pulp show a small but definite improvement.

## Fuels and Power Plant Operation*

B. F. BURNS, Chief Engineer
International Paper Company

On September 17, 1941, a meeting of members of the Heat and Power Committee of the TAPPI Engineering Division was held and attended by Messrs. J. W. Ogden, Vincent Water, Edwin F. Burns, and Roderick O'Donoghue. At that meeting various subjects were discussed for committee work or investigation.

It we felt due to the all out effort of the United States to assist England in the successful prosecution of the war, that the study of fuels was a very timely subject; that the pulp paper, and paperboard industry might aid in the conservation of fuels and by so doing, benefit not only the industry but the war effort as well. The project is of greater importance now that the United States is at war.

Consequently a questionnaire, "Fuels and Their Application," was prepared and forwarded to some 250 mills throughout the United States and Canada. This study undoubtedly has met with the approval of the industry because over 60 per cent have responded, with questionnaires still coming in.

From an examination of the data thus far tabulated, there seems to be far too wide a variation in operating results as evidenced by a spread of 27 points in operating efficiency, and we feel that we should all ask ourselves a few definite and pointed questions—especially at this time when we are all endeavoring to conserve national resources and eliminate wastes.

1) Is the fuel which I am now burning that fuel which is best suited to my location and equipment?

2) Is my fuel storage supply sufficient to carry me through emergencies which may arise or is there a possibility that I may be required to take inferior fuels—if such emergency arises—to maintain plant operation—resulting in higher operating costs and waste.

3) In case my present supplier becomes unable to make coal shipments over an extended period, have I another source of supply in view.

4) To those of us who are dependent on oil fuel at present, have we analyzed our situation from the standpoint of possible fuel oil rationing.

We are all in an "all out" war now and these questions should be given serious consideration.

A few questions on general plant housekeeping which may conserve fuel and ease the load on a perhaps overloaded steam plant should be considered.

1) Is my steam plant clean? A plant which is dirty and untidy externally is most sure to be dirty internally and therefore inefficient.

2) Is the equipment in good mechanical condition? Is it operating as it was designed to operate or are we apt to have mechanical break-downs just when it is very difficult to obtain replacement parts?

3) Has pipe covering been checked recently and did we re-cover that length of steam pipe which was renewed some time ago?

4) When did I last check the boiler settings with a candle for leaks in brickwork?

5) How are my draft gages operating and can I operate with a more nearly balanced furnace condition to reduce excess air?

6) Was that soot blower "reported out of order last week" repaired?

7) Are all possible "returns" coming back to heater or hotwell and what about those leaking steam traps?

8) Did we check pulverization to determine the cause of those "sparklers" in the furnace?

9) What is the combustible in furnace ash?

*A Preliminary Report of the Production and Transmission of Power subcommittee.

## Steam Saved by Better Water Removal at the Presses

W. G. MacNAUGHTON, Engineer
News Print Service Bureau

Considering water removal by the presses, an analysis of the operation shows that several factors are involved:

1) Pressure applied per square inch of contact area (increased from press to press).

2) Length of time any part of the traveling web is subjected to pressure.

3) Type of presses—plain or suction—in addition to other factors common to both.

a) If plain, the resistance of the felt to the flow of water expressed from the nip.

b) If suction, the width of the suction box, the location of the nip to the suction box, the hole area as per cent of the total area, and the amount of partial vacuum carried.

4) Number of presses or nips to which the web is subjected.

5) Felt structure, its porosity and absorbency, as well as the means by which the felt is fitted to perform its function.

The condition of the paper to the presses being from 80 to 88 per cent water and 20 to 12 per cent dry fiber, it is the function of the press section to remove from the web as much of the water as economically possible without adversely affecting quality and deliver it to the dryers as dry as possible.

The index of effectiveness of the press operation is consequently how little water is left in the sheet for the dryers to evaporate, regardless of its condition initially.

On different newsprint machines, there is a wide range in the water-fiber condition of the paper leaving the presses.

It is very unfortunate that no instru-

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ment is commercially available by which a continuous record is made of the water content condition of the sheet as it is delivered to and from the presses. In 1925 Technical Association Papers, Rees and Wilson describe a moisture meter based on the principle of electrical conductivity which was being tried. Although it was said to show considerable promise, the development was never carried to completion.

Under existing practice, moisture tests can only be made by breaking the sheet in order to get a sample—and when a break occurs it is difficult to secure a representative sample since the press conditions are usually disturbed in getting the paper over the machine.

The importance of a record of the water condition of the sheet to the dryers lies in the fact that it is this factor of water content that exerts the greatest influence in the quantity of steam called for in drying each ton of paper produced. It is true that there are other factors of importance, but they do not compare in importance with the quantity of water left in the sheet and which has to be evaporated by the dryers.

Prior to 1923 and during several years thereafter, a series of valuable studies were carried out by Rees and Wilson of the research staff of F. C. Huyck & Sons on the presses of both fourdrinier and multicylinder paper machines and on the action of the felts.

The fourdrinier machines investigated were a number making newsprint paper which as customary at that time were equipped with three and, in one case, with four plain presses. In these studies the various press factors were investigated and their relations correlated. As the studies proceeded it was found that a definite relation existed between a number of these and the width of the pressure zone or nip contact between the press rolls.

The factors involved are: (a) pressure applied per lineal inch of roll; (b) diameter of the press rolls; (c) plasticity or hardness of the roll covering; and (d) thickness of the roll covering.

In the studies (of plain presses) by Rees and Wilson where the same pressure per lineal inch was used and the same speed, they found that the dryness of the sheet after pressing varied directly with the hardness of the two press rolls.

In the case of two rolls of unequal hardness—as a metal or stone roll and a rubber-covered roll, the dry sheet was obtained when the harder of the two operated in the top position.

The result is interesting because it represents the general papermaking practice and as it happens this placing of the hardness effects assists also to conserve the life of the felts.

On paper machines the diameter of the press rolls is governed largely by the width of the machine, or in other terms the length of the rolls, so as to minimize the tendency toward deflection. In practice the thickness and plasticity of the roll covering are decided upon when the rolls are supplied or are re-covered.

The chief, if not the only essential, difference between plain and suction presses is in the way by which the water continuously pressed from the web of paper at the nip contact is removed from the pressure area.

On newsprint machines before the application of suction presses, as speeds were increased, three plain presses were found necessary in order to bring the sheet to the dryness desired without crushing.

In general the procedure has been followed of increasing roll pressure from press to press as the sheet proceeds.

When the suction press was developed it was placed at first in the first press position followed by two plain presses. The next step in development was to use suction presses in both first and second press positions followed by a third plain press with a bottom roll of low plasticity and using concentrated pressure on it.

It was then found that the third plain press did not usually remove sufficiently more water to warrant its use, and in many mills the felt was removed and the former third press operated as a smoothing press. In others this press was removed leaving two suction presses with or without a smoothing press.

Data on forty-eight newsprint machines which have either first or second suction presses, show variations in diameter of holes, the number per square foot and the percentage of hole area in the suction rolls.

The trend is apparent toward 5/32 inch diameter holes, but there is a wide range to the number of holes per square foot and in the percentage of hole area. On machines in the speed range above 1,100 fpm the first press has up to twice the number of holes per square foot as in the second press.

From a theoretical standpoint it would appear that more water would be removed each successive time the sheet is passed through a press. However, from a review of the practice on fifty-two newsprint machines, it would appear that the industry in general is satisfied with the degree of water removal obtained with two suction presses.

It is of interest, however, to mention the second triple-roll suction press on the new machines installed during the year at Great Northern Paper Company, Millinocket, Maine. With this equipment it is said that, at machine speed of 1,100 fpm, the water in the sheet to the dryers is reduced to 59 per cent leaving the sheet 41 per cent dry fiber content.

At this figure the water to be evaporated to bring the sheet to 8 per cent water when dried would be 2,488 pounds per ton of paper and at 1.4 pounds of steam per pound of water the theoretical quantity of steam would be 3,480 pounds per ton of paper.

Through the co-operation of mills in the News Print Service Bureau, data on a large number of newsprint paper machines in United States and Canada were collected.

Comparing machines with different combinations of plain and suction presses, at the same time taking into account the speed and the total pressure on all the presses, in pounds per lineal inch per 100 foot of speed, the superior dryness of the sheet may be noted with suction presses as against plain presses in same position.

Comparing machines in the different ranges of speed where they are equipped with two suction presses, it may be seen that as the speed increases, the pressure in pounds per lineal inch per 100 foot of speed decreases and at the same time the sheet going to the dryers become wetter. In other words as the machine speed increased, the pressure per lineal inch has not been increased in proportion.

Data on the amount of vacuum carried on the suction presses were not collected nor on the volume of air per unit area evacuated through the vacuum pumps, so that it can only be conjectured that these as well as the porosity and absorbency of the felts are important factors in the operation of suction presses.

With rubber-covered suction presses the average pressure in terms of pounds per lineal inch per 100 foot of speed is 30 to 40 per cent greater than with those of plain bronze.

As a result the rubber-covered suction press delivers a sheet with nearly 3 per cent less water and shows an increase in felt efficiency of 30 to 40 per cent against plain bronze presses.

The statement which appears in Volume V of the textbooks (*Manufacture of Pulp and Paper*), that it costs twelve times as much to remove water by the heat of the dryers as it does by mechanical pressure, is only partly true. It is doubtless correct to the point where the water content of the sheet is more than perhaps 70 per cent.

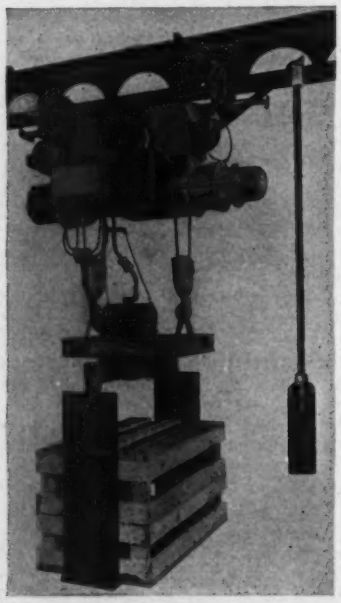
# NEW EQUIPMENT AND SUPPLIES

## Motor-Driven Crate Grab and Carrier

Cleveland Tramrail Division of The Cleveland Crane & Engineering Co., Wickcliffe, Ohio, has developed a motor-driven grab and carrier for the handling of crates and boxes. The grab and carrier is motorized with all operations controlled by six buttons of a pushbutton station. If desired, the grab and carrier can be provided with an operator's cab in which all controls may be located.

The arms of the grab are extended and retracted by means of geared slide bars that are driven by a motor mounted on the top of the grab. Power is supplied to this motor through a flexible cable that is held taut by a spring-type retrieving reel.

A double-hook cable type electric hoist elevates and lowers the grab. A quick-acting electric brake stops and holds the load wherever desired.



The unit illustrated will lift loads up to 1500 lb. a distance of 20 ft. The arms may be spread to a maximum of 36 in. and retracted to a minimum of 18 in. Similar units can be built for heavier loads and to suit other dimensions.

## Flow Meter for Extremely High Pressures

Cochrane Corp., 17th St. & Allegheny, Philadelphia, has announced a flow meter for application in process operations where pressures are in the neighborhood of 5,000 lb. psi. The meter is a special adaptation of the ring balance (tilting U-tube), is entirely closed, and has no internal working parts.

The mercury sealed manometer is a stainless steel ring 15 in. in diameter. The ring is balanced on knife edges at its geometric center. The partition at the top of the ring is formed of a solid stainless steel block suitably drilled for the pressure connections. Nickel tubing connects the top of the ring to the center of rotation where they join the free (inboard) ends of the twin 6-in. nickel torsion tubes. The outboard ends of the torsion tubes are anchored and to these the pressure lines

from the primary elements are connected. By this design the ring tilts 10 deg. for the full differential range measurement which may be between 4 and 9 in. of mercury depending on the cam weight supplied. Flow is expressed directly in uniform increments on the 36-in. indicating scale which also may be combined with an integration and for 12-in. recording chart feature.

## New Paint Product

American-Marietta Co., 43 E. Ohio St., Chicago, has announced a paint that primes, seals, and finishes on an interior surface in one coat. Designated as *Valdura Singlekote*, the paint is available only in white; however, it may be tinted with alkali-resistant colors in oil. The manufacturer states that this product sets within two hours, dries within 12 hours, covers up to 750 sq. ft. per gallon, and may be used on such interior surfaces as plaster, concrete, brick, wallboard, wood, and metal.

## Coating for Metal Insulation

A synthetic resin type of coating, known as *Resiflex*, has been announced by David C. Brown Co., 17532 Wisconsin Ave., Detroit. This coating, according to the manufacturer, has a high dielectric strength, a low power factor, unusual arc resistance, heat endurance, and extreme flexibility. The manufacturer also states that it is waterproof, oilproof, greaseproof, and impervious to mineral acids, alcohols, and gasolines. It is furnished in water clear solution only, application being made by dipping, brushing, or spraying and then baking for from 6 to 30 minutes at 275 Fahr., depending on size of unit and type of material.

## High-Speed Steel

A low tungsten-molybdenum steel, designated as *TCM High Speed Steel*, has been announced by The Jessop Steel Co., 568 Green St., Washington, Pa. The manufacturer states that this steel is lighter in weight and cuts as well or better than 18-4-1, which it replaces.

## New Type of Valve

The Fairbanks Co., New York, is introducing a line of bronze valves, designated as *Faircoseal*, which contain pre-inserting rings of a silver brazing alloy in the port openings, instead of threads. With this design, valve and pipe can be brazed together into a one-piece piping assembly by application of an oxyacetylene flame. With these bronze valves, copper, yellow or red brass, copper-nickel, and Monel pipe can be used. The manufacturer states that the valves can be used successfully with steam, oil, hot or cold water, compressed air, Freon, sulphur dioxide, etc.

## Blackout and Glass Shatter Screen

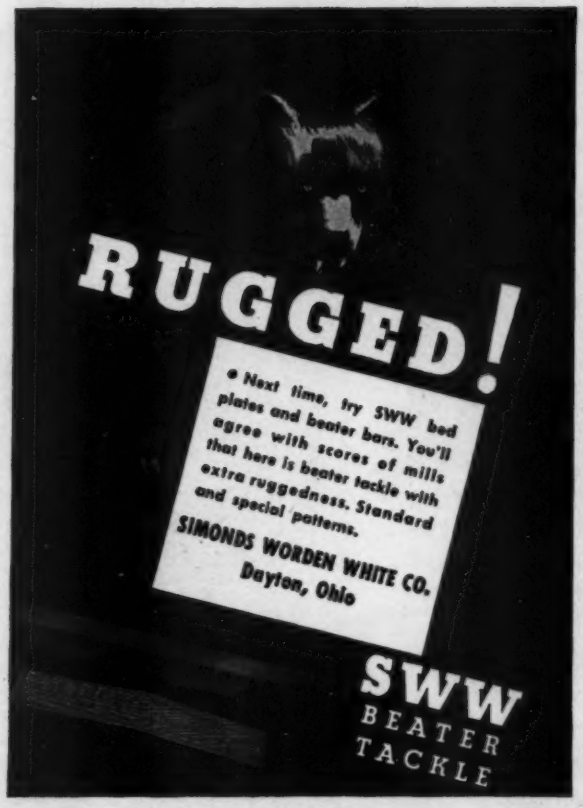
Research Products Corp., Madison, Wis., has announced the development of a blackout and shatter screen, consisting of a porous blanket made up of 16 layers of black

flameproof expanded fiber and four layers of light colored flameproof expanded fiber. This material is mounted in a light wooden frame and attached inside of windows, skylights, and door glass.

## Electrically-Operated Trucks

Clark Tructractor Division of Clark Equipment Co., Battle Creek, Mich., manufacturers for more than 20 years of gas-powered industrial trucks, has announced that it is now providing its trucks with full electric equipment for storage battery power, where electric operation seems best fitted to the job.

The machines lift from 2,000 to 7,000 lb., using an hydraulic vane type pump driven by special series wound motor. The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same pump operates the tilting unit, which enables the operator to tilt the load back 10 deg. in 5 sec. for safe riding, and tilt it forward 3 deg. in 1 sec. for tiering. The machines have four speeds forward and four speeds in reverse, with speeds up to 6 mph. under full load, 7.5 mph. empty. The trucks will climb 7½ per

cent grade under maximum loads. Drive is on the front wheels, with rear wheel steer.

Standard equipment includes hydraulic brakes, centrally located control levers, spring-mounted rubber-cushioned seats, disc type wheels, electric horn. The motors and electric control equipment are supplied by General Electric. There is a choice of Edison alkaline battery or any standard make of acid battery.

## Ultraviolet Unit for Paper Industry

Pfaltz & Bauer, Inc., Empire State Bldg., New York, are offering a new pure fused quartz ultraviolet generator for the paper industry. The generator is suggested by

the profferer, for the study of wood fibers, coloring matters and loadings, for making accelerated exposure and fading tests, for identification of paper blemishes, and for showing textures of paper and punctures in it.

## New Design of Pressure Indicating Gauge

A patent cam and roller movement has been developed by Certified Gauge and Instrument Corp., Long Island City, N. Y., for use in pressure indicating gauges. This movement employs a sector-shaped driving cam and a driven helical roller. One end of the pivoted cam is linked to the tip of the Bourdon tube, while the other end is aligned with and fits freely into the thread of the roller. A hair-spring limits the point of contact between cam and roller to only one side of each element, and prevents backlash. The driving cam has a facing of plastic material.

According to the manufacturer, tests have shown no wear on contact surfaces of cam

or roller after millions of cycles of operations. The manufacturer also states that the movement provides smooth and constant transmission of motion from Bourdon tube to pointer.

## All-Spray Nozzle

An all-spray water nozzle, the *Alfcospray*, has been introduced by American-La France-Foamite Corp., Elmira, N. Y. From the shutoff position, a slight turn of the tip immediately gives a cone spray of 40 deg. Further slight rotation produces increasing cones up to full curtain of 150 deg., with reversal back to shutoff without any intervening straight stream.

***Alfcospray Full Curtain*** ***Alfcospray Model 10F***

The nozzle, known as Model 10 F, can be furnished for any 2½ in. hose thread, also for Underwriters' tip thread, 2 in. hose thread, or 1½ in. thread.

In the 40 deg. spray position, the capacity is about 95 gpm and 135 gpm at 50 lb. and 100 lb. inlet water pressure respectively. The full curtain capacity at these pressures is approximately 170 gpm and 215 gpm.

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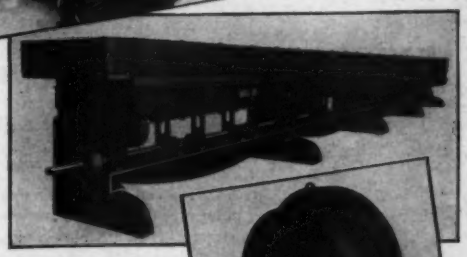

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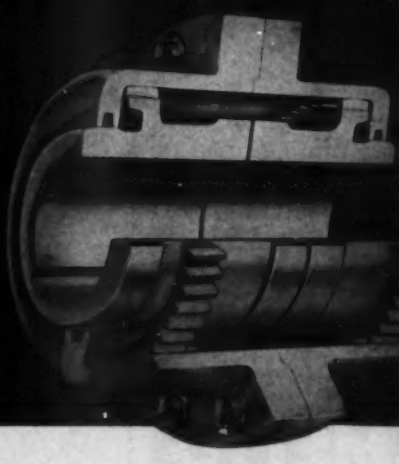

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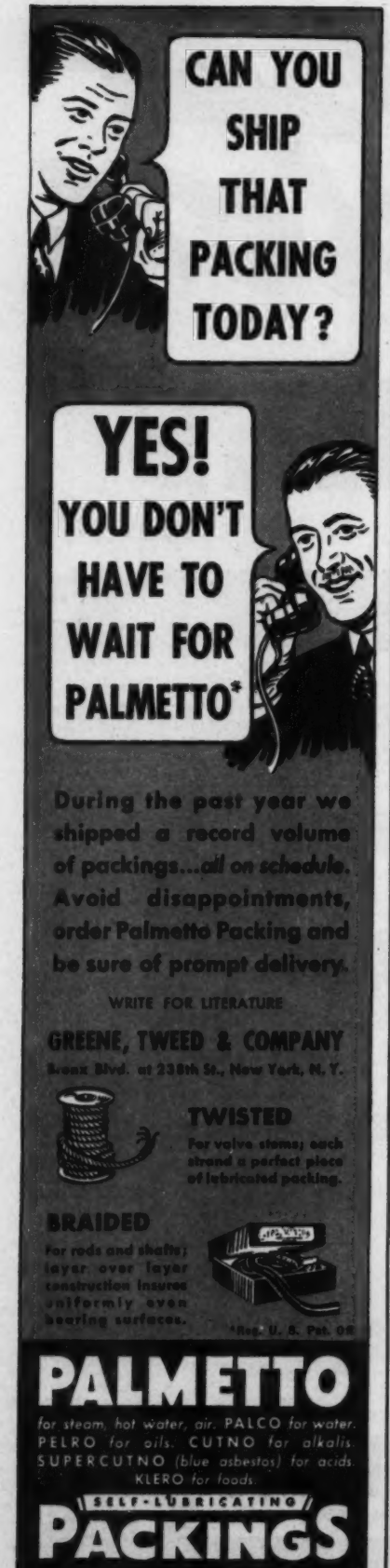
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# TECHNICAL DEVELOPMENTS

**These abstracts are of the latest developments found in the American and foreign press.**

## Recent Tall Oil Patents

These refer to the processes of treating and refining the oil. The fatty acids were separated from the rosin acids in distilled tall oil by esterifying the former with an alcohol having less than 5 carbon atoms and then esterifying the resin acid with a polyhydric alcohol like ethylene glycol, glycerol, etc. Fatty acid esters are distilled under diminished pressure. The crude tall oil may be refined by dissolving it in a petroleum hydrocarbon and then bringing the solution into contact with an immersible solvent (ethylene chlorhydrin, ethylene glycol, etc.) which removes coloring matters and malodorous substances. Tall oil fatty acids and resin acids may also be separated by converting; the mixture is esterified with relatively high boiling alcohols, and the fatty acid esters then transesterified with lower boiling alcohols. The final mixtures of esters are then distilled. Saponified, hydrogenated tall oil in a solution of an organic solvent, when chilled, gave precipitates of the fatty acid soaps. E. Segessemann. U. S. Patent 2,199,-653 (May 7, 1940); 2,275,186 (March 3, 1942); 2,278,674 (April 7, 1942); 2,276,-517 (March 17, 1942).

## Lignite in Board Manufacture

Lignite, containing 20 per cent water after being shredded, milled, and baled, found a use in the manufacture of water repelling cardboard which is not deformed by steam, and which is oil and fat-resistant. The proposed uses of lignite included fuel filters, insulating and packing materials and lining concrete fuel tanks. The chemical conversion of lignite into cellulose or its hydrolysis to sugar has also been proposed. The latter can then be used in fodder-yeast preparation or in the manufacture of alcohol. (R. Beyschlag, Braunkohle, 39, 399, 1940 through C. A. 36, 2077, 1942.

## Vanillin from Lignin Materials

A contribution from the Department of Chemistry and Chemical Engineering, and Lignin and Cellulose Research Laboratories of the University of Washington—An oxidizing mixture of cupric hydroxide in alkaline solution was tried on the solids of sulphite waste liquor, on "butanol lignin" and on Meadol. Yields of 10-20 per cent vanillin are reported. Experiments were also made on these industrial lignin materials with Fehling solution and with cupric hydroxide-calcium hydroxide mixtures. Yields of 9-16 per cent vanillin (based on the lignin content) were found. The author also gives a rapid method for the determination of vanillin by the use of 2, 4-dinitrophenal hydrazine in HCl. Irwin A. Pearl. J. Am. Chem. Soc. 64, 1429 (1942).

## Metallic Stearates, Their Properties and Uses

Aluminum stearate is used in the paper industry in waterproofing insulating wrappings, and is also used in waterproofing concrete, ropes, leather, and canvas. Mercury stearate has been suggested as a bactericide for use in paper money. Properties and possible uses of calcium, zinc, magnesium, barium, cobalt, copper, iron, lead, nickel, silver, and titanium stearates are also given. A. Monsaroff. Can. Chem. Process Ind. 26, 193-6 (1942). through Bull. Inst. Paper Chemistry 12, 329 (1942).

## Wood Density Determinations

Wood density determinations on chips may be made conveniently, together with continuous moisture determinations. After drying and weighing, samples are dipped into molten paraffin and drained. Chip volume is measured by water displacement, in a glass vessel which is provided with a ground-in top section ending in a small tube. The latter is so constructed and graduated that the density of the chips may be read off directly. The accuracy is claimed to be 0.3 per cent. K. Rieth. Papier-Fabr. 39, 246 (1941). Svensk Papperstidn. 44, 560 (1941) through Bull. Inst. Paper Chemistry 12, 346 (1942).

## Butanol Recovery after Butanol Pulping

By using a cooking liquor from which butanol had been distilled off quantitatively, but which retained alkali, lignin, and carbohydrates, and by adding thereto known amounts of butanol, the author was able to extract the latter almost quantitatively by extracting with isopropyl ether for 4-8 hours. A quantitative recovery was also obtained by distilling 1 liter of water saturated with butanol (i. e., containing 8 per cent) in distilling flask of a definite efficiency and collecting 210 ml. of distillate, an azeotropic mixture which separates into 100 ml. (alcohol layer) and 110 ml. (water layer). In the case of larger volumes, the author describes certain modifications in the techniques of distillation. (A. J. Bailey, Ind. Eng. Chem. 34, 483-5, 1942.)

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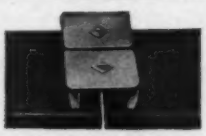

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**Fairbanks Sphero Valves are different . . . instead of a wedge or disc there is a revolving ball plug which wipes the seating surfaces clean. The shearing action cuts through heavy solids and liquids. There is nothing on which scale or foreign matter can accumulate.**

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**When seat rings or other parts become worn, they can be replaced without removing the valve from the pipe line.**

**Write for descriptive Bulletin V-103.**

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# New Catalogues, Ass'n Reports, and Publications

**Allis-Chalmers Mfg. Co.**, Milwaukee, Wis.—A maintenance handbook, "A Guide to Wartime Care of Electric Motors," has just been announced by this company. This book applies to all makes of standard, general-purpose motors and contains no advertising. To clarify the overall problem of motor care, each factor opposing long and trouble-free motor life is treated separately. Thus, the heading of the first section is—"Electric Motor Enemy No. 1 . . . DUST." Other subjects—considered in turn—are moisture, stray oil, friction, vibration, misalignment, uneven wear, overload, and underload.

**American Manganese Steel Div. of American Brake Shoe & Foundry Co.**, Chicago Heights, Ill. Bulletin No. 742-CN entitled "Manganese Steel Chain for Elevating and Conveying" has recently been published. This 16-page bulletin gives complete information and technical data about manganese steel and its various uses. It is profusely illustrated, treating the use of chains in the steel industry, in dredging, in the saw mill and paper mill, etc.

**American Pulley Co.**, Philadelphia, Pa.—This company has just released Bulletin CP-42, which describes in detail the solid-type steel conveyor pulleys (type "N"), and the split-type steel conveyor pulleys (type "O"). Both types are pictured and prices listed.

**De Laval Steam Turbine Co.**, Trenton, N. J.—An article by H. Gartmann entitled "Pump Design Affords Wide Scope in Application" has been reprinted by De Laval and is being distributed upon request. It contains an elementary analysis of centrifugal pump performance, and explains, by means of simple diagrams, the influence of blade angles and of the areas of wheel passages upon the head-capacity curve.

**Leeds & Northrup Co.**, Philadelphia, Pa.—"Centrimax Flowmeter for Steam and Water" is described in a new 20-page catalogue by this company. The Centrimax Flowmeter is a high-accuracy instrument for measuring and integrating flow of water, steam, and other fluids. The Centrimax employs the balance method, weighing flow on a beam by balancing differential pressure, representing flow, with the centrifugal force of a flyball system, and integrates directly.

**Link-Belt Co.**, Chicago—This company has just published a 32-page illustrated catalogue and data book, No. 2075, on the "Link-Belt Bulk-Flo Elevator-Conveyor." As compared with the catalogue issued last June, when this new bulk conveying system was announced, two new sizes are included, and power formulae and other engineering data have been added. The book contains diagrams showing paths of operation, and gives a long list of materials that can be handled, as well as other interesting information.

**Lukens Steel Co.**, Coatesville, Pa.—"Salvage," a brochure issued by this company, explains just how this industrial concern enabled its home community to establish what is believed to be a record for the collection of war-use salvage. Step by step, it explains how the steel company enlisted the co-operation of Coatesville's public officials, its daily newspaper, such organizations as the Red Cross, the Chamber of Commerce, and the Council of Defense, and finally Coatesville's men, women, and children.

**Milton Roy Pumps**, Philadelphia, Pa.—Bulletin No. 426 explains how the Step-Valve used in Milton Roy pumps is designed for specific purposes, how it functions in pumping against pressures up to 20,000 lb. psi, and in handling such materials as butadiene, salt slurries, fibers in suspension, etc.

**Monsanto Chemical Co.**, St. Louis, Mo.—The 26th Edition of "Monsanto Chemicals," an entirely new 170-page book, has recently been compiled. It contains chemical names, trade names, formulas, standard forms or grades, uses, general information, and available special literature on all of the several hundred chemicals and plastics manufactured by this company. Also, a general technical section includes tables of physical constants for some of the more common chemicals.

**W. H. Nicholson & Co.**, Wilkes-Barre, Pa.—This company has just published a bulletin (No. 642) on the Nicholson flexible coupling. Information is given under the subjects of constructon, functions, lubrication, strength and durability, installation, and capacity. Price list, dimensions, and weights are also included.

**Paper and Industrial Appliances, Inc.**, New York City—The Brammer recording consistency control is discussed in detail in a recent bulletin by this company. A schematic drawing showing the principle of the Brammer control is included, as well as numerous other illustrations and diagrams.

**South Bend Lathe Works**, South Bend, Ind.—Catalogue No. 16, describing South Bend 16 in. precision lathes, has just been issued by the manufacturer. Both the 16 in. toolroom lathes and 16 in. quick change gear lathes are completely illustrated and described. Attachments, accessories and tools for use with these lathes are also listed. For copies write to Department P5.

**Williams Gauge Co.**, Pittsburgh, Pa.—Comprehensive information regarding Williams equipment for power plant service is given in the company's latest catalogue No. 142. Such equipment as the Williams-Hager check valve, steam pump governor, steam operated, trap, high and low alarm water column, water gauge, is included, and illustrations and dimensions are given.

## Books

**The Stone That Burns**—In this book is told the story behind the development of the American sulphur industry. Opening dramatically with the first pumping of sulphur by the Frasch process, one day in late December, 1894, at a location in southwestern Louisiana, close to the Gulf of Mexico and roughly halfway between Lake Charles and the Texas state line, the story next relates the difficulties incident to the proving of the process. Then it describes the sulphur deposits of the Gulf Coast, discusses Silician sulphur and pyrites, and tells of the competitive situation that developed between American and Silician sulphur.

Next, after telling the story behind Freeport and Bryanmound, the period of the First World War is related, the particulars concerning the Old Gulf and the new competition portrayed, and facilities for additional production described. In the latter case, the narrative treats of the Hoskins mound, Boiling dome, Duval and Jefferson Lake and the Grand Ecaille dome. The account concludes with a chapter on sulphur: today and tomorrow. An extensive section given over to a bibliography and to statistical data completes the volume. Written by Williams Haynes, it is a colorful presentation that treats of American courage and perseverance. Priced at $3.75 a copy, the publisher is D. Van Nostrand Co., Inc., 250 Fourth Ave., New York, N. Y.

**Trade and Professional Associations of the United States**—Prepared in the U. S. Department of Commerce, this volume of 320 pages presents basic data on trade associations, professional, consumer, and farmer organisations, patriotic societies, and labor unions. All associations are classified into industrial and geographical groupings, and summarized census data are given on the relative size of all major industries in the United States. Much other factual material is included for each of the 48 states, such as number of factories, retail stores, farms, and service establishments. The author is C. J. Judkins, Chief, Trade Association Section, Commerce Department. It is available from the Government Printing Office, Washington, D. C. at 70c per copy.

**Water Handbook**—This attractive and durable booklet of 64 pages, spiral bound, and with a page size of 8½ in. by 11 in. is arranged in two sections. The first section discusses 25 methods of water analyses, with procedures and calculations; the second section, interpretations of the tests and their application to plant control. Scattered throughout the publication are sixteen graphs and fifteen illustrations of different pieces of testing equipment. Published by W. H. and L. D. Betz, Gillingham and North Streets, Frankford, Philadelphia, Pennsylvania, the handbook is priced at 50c a copy.

**Wood Pulp Statistics (1942 Edition)**—The United States Pulp Producers Association, 122 E. 42nd St., New York, N. Y. has issued this booklet in which appears official ten-year data on United States and Canadian production, consumption, imports and exports of wood pulp. Included in the publication also are similar figures, as available prior to September, 1939, for all countries of the world which produce or import wood pulp. The 1941 United States imports, exports and wood pulp consumption figures are estimates of the Association. Price of the publication is $2.00 a copy.

**Saving Fourdrinier Wires**—Designated as TAPPI Monograph Series No. 2, this 21-page publication, prepared by J. E. Goodwillie of Beloit Iron Works and edited by R. G. Macdonald and V. F. Waters of the Technical Association of the Pulp and Paper Industry, has been issued as an emergency contribution to the war effort. It points out ways to get the most use from paper machine wires, thus reducing the industry's need for copper and tin. Copies of the publication will be sent by the Technical Association of the Pulp and Paper Industry, 122 E. 42nd St., New York, N. Y., to any company operating fourdriniers that request them, voluntary contributions to cover cost (about 15 cents per monograph) being acceptable to the Association.

## Association Reports

*All of the orders which affect the industry emanate from the OPA and WPB and clear through the office of E. W. Tinker, executive secretary of the American Paper and Pulp Association. Copies of all government orders are sent by the Association to members. Listed below are releases sent out during July by the APPA. Any correspondence with that office regarding these releases should carry identifying numbers under "National Defense, Legislation and Public Affairs."*

**No. 155**—Amendment to L-146—Welding Rods and Electrodes.

**No. 156**—Clarification of Priorities Regulation No. 11.

**No. 157**—Interpretation 2 of General Preference Order M-93 (Wood Pulp).

**No. 170**—Amendment 3 to Maximum Price Regulation 114 (Wood Pulp).

**No. 171**—Wood Pulp Allocations Informative Bulletin No. 15.

**No. 172**—Policy to Prevent Pirating of War Workers.

**No. 176**—Transportation. General Order O.D.T. No. 17.

**No. 177**—Amendment No. 2—Priorities Regulation No. 10.

**No. 178**—Copper—Supplementary Conservation Order M-9-c-4.

"NON-USERS ARE THE LOSERS"

# PROFIT PRODUCERS

TENAX FELTS

## TODAY'S PROBLEMS

There are two angles to the paper and board businesses in wartime. (1) more orders available, and (2) less help to be had - - - - in this extremity production engineers and superintendents are turning to TENAX FELTS - - - - seasoned workers which start quick, run long hours at higher speeds, and turn out perfect product.

*"Non-Users Are The Losers"*

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Newfane, N. Y. — U.S.A.

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**Modern Pulp and Paper Making** ..... $6.75
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## *Study This List... Make An Offer*

**Surplus Stocks of the following materials, in the quantities noted, are available for immediate sale:**

| Material | Pounds | Material | Pounds |
|---|---|---|---|
| Acetic Acid (28%) | 1,150 | Stearic Acid—1 press | 5,705 |
| Ammonium Alginate | 537 | Trisodium Phosphate | 2,179 |
| Barytes | 6,600 | Tuads | 1,000 |
| Dixie Clay | 8,972 | Sodium Oxalate | 384 |
| Essotex | 4,300 | Butyl Stearate | 3,454 |
| Locust Bean Gum (A Grade) | 1,780 | Gelatine (Indegel F) | 1,470 |
| Aroclor #1254 | 468 | Keystone Whiting | 149,575 |
| Cork—through 18 mesh, on 30 mesh | 1,384 | Karaya Gum | 2,426 |
| Cumar VI-1½ | 287 | Sussex Whiting #100 | 48,860 |
| Laurex | 1,279 | Veroc Whiting | 21,900 |
| Leather Odorant (V-6031-3) | 25 | Pumice—8 plus 30 | 40,115 |
| Morpholine | 450 | Pumice Stone WCD #2 | 1,228 |
| Naphthenic Acid | 198 | Pumice Stone G50RT | 1,181 |
| Nuva Rosin | 2,383 | Accelerator #122 | 230 |
| Sodium Fluoride | 342 | Cumar RH | 1,696 |
| | | Cumar AX | 422 |

The materials and quantities listed above are subject to prior sale. Terms: F.O.B. plant location in metropolitan New Jersey. Every offer will be given careful consideration. If interested, communicate with:

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# CURRENT MARKET QUOTATIONS

### RAGS (Domestic)
f.o.b. New York City

NEW RAGS — *per cwt.*

| | |
|---|---|
| Blue Overalls | 5.50 to 5.75 |
| Corduroy | 2.75 to 3.00 |
| **Cottons—** | |
| Washables, No. 1 | 3.00 to 3.25 |
| Fancy Percales | 4.40 to 4.60 |
| New Soft Blacks | 3.75 to 4.00 |
| New Light Seconds | 2.75 to 3.00 |
| New Dark Seconds | 2.50 to 2.75 |
| **Khaki Cuttings—** | |
| Mixed | 3.25 to 3.50 |
| O. D. | 4.00 to 4.25 |
| New White Canvas | 6.50 to 6.75 |
| New Mixed Blacks | 3.00 to 3.25 |
| **Shirt Cuttings—** | |
| New White No. 1 | 6.75 to 7.00 |
| Silesias No. 1 | 5.00 to 5.25 |
| New Unbleached | 7.00 to 7.25 |
| Fancy | 3.50 to 3.75 |
| **Linen Cuttings—** | |
| White | 14.00 to 14.50 |
| Grey | 13.50 to 14.00 |

### RAGS (Domestic)
f. o. b. New York City

OLD RAGS

OPA ceiling prices in sales to consuming mills f. o. b. cars at points of shipment, with brokers' allowances of $1 to $2 a ton depending on the value of the grade involved.

| Roofing— | *per ton* |
|---|---|
| No. 1 | 31.00 |
| No. 2 | 29.00 |
| No. 3 and No. 4 | 27.00 |
| **Twos and Blues—** | |
| Repacked | 44.00 |
| **Thirds and Blues—** | |
| Repacked | 44.00 |
| Miscellaneous | 36.00 |
| **Whites, No. 1—** | |
| Repacked | 76.00 |
| Miscellaneous | 64.00 |
| **Whites, No. 2—** | |
| Repacked | 58.00 |
| Miscellaneous | 53.00 |

### RAGS (Foreign)
ex dock New York City

NEW RAGS — *per cwt.*

New Dark Cuttings
New Mixed Cuttings
New Light Silesias
Light Flannelettes — Nominal
Unbleached Cuttings
New White Cuttings
New Light Oxfords
New Light Prints

### RAGS (Foreign)
ex dock New York City

OLD RAGS — *per cwt.*

No. 1 White Linens
No. 2 White Linens
No. 3 White Linens
No. 4 White Linens
No. 1 White Cottons
No. 2 White Cottons
No. 3 White Cottons
No. 4 White Cottons
Extra Light Prints
Ord. Light Prints — Nominal
Med. Light Prints
Dutch Blue Cottons
French Blue Cottons
French Blue Linens
Checks and Blues
Linsey Garments
Dark Cottons
Old Shopperies

### ROPE and BAGGING
f. o. b. and ex dock New York City

| Gunny No. 1— | *per cwt.* |
|---|---|
| Foreign | Nominal |
| Domestic | 4.50 to 4.75 |
| Wool Tares— | *per cwt.* |
| Light | 4.25 to 4.50 |
| Heavy | 4.50 to 4.75 |
| No. 1 Scrap Bagging | 3.75 to 4.00 |
| **Manila Rope—** | |
| Foreign | — |
| Domestic | *115.00- |
| New Burlap Cuttings | 5.75 to 6.00 |
| **Jute Threads—** | |
| Foreign (Nom.) | 6.25 to 6.75 |
| Domestic | 5.50 to 6.00 |
| **Strings—** | |
| Sisal | 4.00 to 4.25 |
| Soft Jute | 4.75 to 5.00 |
| Mixed | 1.25 to 1.50 |

*OPA ceiling price per ton f. o. b. shipping point.

### WASTE PAPER
F. O. B. New York City

| Shavings— | *per ton* |
|---|---|
| White Env. Cuts, One-Cut | 67.50- |
| Hard White Env. Cuts | 62.50- |
| Hard White, Unruled | 57.50- |
| Hard White, Ruled | 50.00- |
| Soft White, One-Cut | 57.50- |
| Soft White, Misc. | 43.00- |
| Fly Leaf, No. 1 | 33.50- |
| Fly Leaf, No. 2 | 22.50- |
| Fly Leaf, Woody, No. 1 | 25.00- |
| No. 2 Mixed Col. Woody | 18.00- |
| Mixed Colored | 15.00- |
| **Flat Stock—** | |
| Overissue Magazines | 22.00 to 23.00 |
| No. 1 Heavy Magazines | 20.00 to 21.00 |
| Mixed Books | 11.00 to 12.00 |
| **Ledger Stock—** | |
| No. 1 White | 31.00 to 32.00 |
| No. 1 Mixed (Colored) | 26.00 to 27.00 |
| **Manilas—** | |
| New Env. Cuttings | 53.00- |
| New Env. Cuts, One-Cut | 57.50- |
| Extra Manilas | 37.00- |
| **Manila Tab Cards, Free of Ground Wood** | 45.00- |
| **Colored Manila Tab Cards, Free of Ground Wood** | 30.00- |
| **Ground Wood Manila Tab Cards** | 27.00- |
| **Ground Wood Manila Tab Cards, Colored** | 20.00- |
| **Kraft—** | |
| Envelope Cuttings | 55.00- |
| Mixed Env. or Bag Cuts | 55.00- |
| Tripled Sorted No. 1 Brown | 50.00- |
| New 100% Cor. Cuts | 35.00 to 36.00 |
| No. 1 Old Assorted | 29.00 to 30.00 |
| **News—** | |
| White Blank | 26.00 to 27.00 |
| Overissue | 9.00 to 10.00 |
| No. 1 Baled | 7.00 to 8.00 |
| Old Corrugated Boxes | 9.00 to 10.00 |
| New Corrugated Cuts | 11.00 to 12.00 |
| Box Board Chips | 4.00 to 5.00 |
| No. 1 Mixed Paper | 4.00 to 5.00 |

### CHEMICALS
f. o. b. shipping point

| Alum (Papermakers)— | |
|---|---|
| Lump, cwt. | 4.25- |
| Ground, cwt. | 4.00- |
| Powdered, cwt. | 4.40- |
| **Blanc Fixe—** | |
| Pulp, bulk, ton | 40.00 to 46.50 |
| Dry, barrels, pound | 60.00 to - |
| **Bleaching Powder—** | |
| Drums, cwt. | 2.25 to 3.10 |
| **Casein (Domestic Standard)—** | |
| 30-30 mesh (bags), lb. | 14.00 to 15.00 |
| 80-100 mesh (bags), lb. | 15.00 to 16.00 |
| Argentine, lb. | 15.00 to 15.50 |
| **China Clay—** | |
| Domestic Filler Bulk (mine) ton | 7.50 to 15.00 |
| Domestic Coating Bulk (mine) ton | 12.00 to 22.00 |
| Imported (ship side) Bulk (lump) ton | 15.00 to 26.00 |
| **Chlorine—** | |
| Tank cars (wks) cwt. | 2.00 to 2.25 |
| **Gelatine (silicin), lb.** | .90 to .95 |
| **Glyc. (C.P.) drums, lb.** | 18.25 to 18.75 |
| **Litharge, powd., bbl., lb.** | .09 to - |
| **Rosin (Gum)—** | |
| New York, per 100 lbs. | |
| E | 3.52- |
| F | 3.55- |
| G | 3.55- |
| WW | 3.74- |
| **Rosin (Wood), carlots** | 3.12- |
| **Salt Cake—** | |
| Dom. bulk (wks) ton | 15.00 to 16.00 |
| Imp. bulks on dock—(Atl. ports) ton (Nom.) | 20.00 to |
| **Soda Ash—** | |
| Bulk (works), cwt. | .90 to .95 |
| Paper Bags, cwt. | 1.05 to 1.35 |
| Barrels, cwt. | 1.05 to 1.35 |
| **Soda (Caustic)—** | |
| Solid, drums, cwt. | 2.30 - |
| Ground and flake, drums, cwt. | 2.70 - |
| **Sodium Silicate—** | |
| 60 deg., 55 gal. drums, (works) cwt. | 1.65 to 2.05 |
| 40 deg., 35 gal. drums, (works) cwt. | .80 to 1.45 |
| **Starch—** | |
| Pearl, 140 lb. bags, cwt. | 3.10- |
| Pearl, barrels, cwt. | 3.30- |
| Paper (Sp.) bags, cwt. | 3.20- |
| barrels, cwt. | 3.30- |
| **Sulphur (crude)—** | |
| (mine) bulk, long ton | 16.00 to 20.50 |
| **Talc—** | |
| Dom. 100 lb. bags (mine) ton | 15.00 to 21.00 |
| Imp. bulk, ton (Nom.) | — |
| **Titanium Dioxide—** | |
| Barium Pig., bbls., lb. | .05¾ to .06 |
| Calcium Pig., bbls., lb. | .05 to .05¼ |
| **Zinc Sulphide, bbls., lb.** | .08¼ to .08½ |

### WOOD PULP

OPA maximum prices applicable to wood pulp delivered to consumer mills located East of the Continental Divide exclusive of Denver, Colo.:

| | |
|---|---|
| Bleached softwood sulphite | 76.00 |
| Unbleached softwood sulphite | 66.00 |
| Bleached hardwood sulphite | 73.50 |
| Unbleached hardwood sulphite | 63.50 |
| Bleached Mitscherlich sulphite | 81.00 |
| Unbleached Mitscherlich sulphite | 72.00 |
| Northern bleached sulphate | 86.00 |
| Southern bleached sulphate | 79.00 |
| Northern semi-bleached sulphate | 82.00 |
| Southern semi-bleached sulphate | 75.00 |
| Standard news print siderurus | 46.00 |
| Northern unbleached sulphate | 73.00 |
| Southern unbleached sulphate | 63.50 |
| Bleached soda pulp | 66.00 |
| Unbleached soda pulp | 62.00 |
| Ground wood pulp | 46.00 |
| Sulphite screenings | 38.50 |
| Sulphate screenings | 38.00 |
| Ground wood screenings | 30.00 |
| Northern unbleached sulphate siderurus | 73.00 |
| Southern unbleached sulphate siderurus | 63.50 |

### PAPER
f. o. b. New York City

| Boards— | *per ton* |
|---|---|
| Binders | 84.00- |
| Chip | 45.00- |
| Chip, sgl. mla. lined | 60.00- |
| Coated, white patent .016 | 80.00- |
| .020 and heavier | 75.00- |
| Kraft liner | 60.00- |
| News | 48.00- |
| **Book (cased)** | *per cwt.* |
| No. 1 Coated | 15.50- |
| No. 2 Coated | 14.00- |
| No. 3 Coated | 13.25- |
| No. 4 Coated | 12.75- |
| No. 2 Offset | 11.00- |
| A Grade Super | 10.75- |
| B Grade Super | 10.25- |
| **Bonds (Rag Content)—** | |
| 100% Rag | *per cwt.* |
| Ext. No. 1 | 42.00 to 46.00 |
| 100% Rag | 35.00 to 37.75 |
| 85% Rag | |
| 75% Rag | 26.90 to 29.00 |
| 65% Rag | |
| 50% Rag | 20.80 to 22.75 |
| 25% Rag | 18.30 to 20.00 |
| Regular Colors | 1.00 cwt. extra |
| **Bonds (Sulphite)—** | *per cwt.* |
| No. 1 | 11.70- |
| No. 2 | 10.75- |
| No. 4 | 9.90- |
| Colors | 1.00 cwt. extra |
| **Glassine (f. o. b. mill)—** | *per cwt.* |
| Embossed (25 lb. up) | 13.75 to 14.25 |
| Bleached (25 lb. up) | 12.75 to 13.25 |
| Unbleach. (25 lb. up) | 11.50 to 12.00 |
| **Greaseproof—** | |
| Bleach. (25 lb. up) | 11.00 to 11.50 |
| Unbleach. (25 lb. up) | 10.00 to 10.50 |
| **Ledgers (Rag Content)—** | |
| 100% Rag | *per cwt.* |
| Ext. No. 1 | 41.40 to 48.50 |
| 100% Rag | 36.25 to 39.25 |
| 85% Rag | 32.20 to 37.75 |
| 75% Rag | 28.15 to 30.50 |
| 65% Rag | 22.80 to 27.75 |
| 50% Rag | 22.10 to 24.25 |
| 25% Rag | 19.50 to 21.50 |
| Regular Colors | 1.00 cwt. extra |
| **Ledgers (Sulphite)—** | *per cwt.* |
| No. 1 | 13.00- |
| No. 2 | 12.05- |
| No. 4 | 11.20- |
| **News—** | *per ton* |
| Rolls (Contract) | 50.00- |
| Rolls (Spot) | (nominal) |
| Sheets | 58.00- |
| **Tissues (Carlots)—** | *per ream* |
| White, No. 1 | 1.12½ |
| White, No. 2 | 1.00- |
| Bleached Anti-Tarnish | 1.15- |
| Colored | — |
| Anti-Tarnish Kraft | .70- |
| Manila | .90 to .95 |
| Napkins, semi-crepe (12½ lb. to M shts.) per cs. | .60- |
| Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs. | .60- |
| Toilet, Bleached (M shts.) per cs. | 5.65- |
| Toilet, Unbleached (M shts.) per cs. | 4.25- |
| **Towels—** | *per case* |
| Bleached | 3.20 to 3.75 |
| Unbleached | 2.60 to 3.05 |
| **Wrappings (Kraft)—** | *per cwt.* |
| Extra Quality | 5.75- |
| Super-Standard | 5.00- |
| No. 1 Wrapping | 4.75- |
| Standard Bag | 4.12½- |
| **Wrappings (Sulphite and Bleached Kraft)—** (Rolls, f. o. b. mill) | |
| **Bleached papers—** | |
| M.F. & M.G. Waxing, 20 lb. (Carloads only) | *per cwt.* 7.25 to 7.50 |
| (10,000 lbs.) | 7.50 to 7.75 |
| Drug wrapp. 35 lb. | 7.00 to 7.25 |
| **Unbleached Papers—** | |
| Com. Grd. Butch. 40 lb. | 5.50 to 5.75 |
| No. 1 Butchers | 5.75 to 6.00 |
| No. 1 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb. | 6.25 to 6.50 |
| No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb. | 6.00 to 6.25 |
| Steam Finish, 50 lb. | 5.00 to 5.25 |
| Water Finish, 40 lb. | 5.50 to 5.75 |
| **Manilas—** | |
| Envp. Mla., Sub. 16-40 (No. 1) | 6.00 to 6.25 |
| Envp. Mla., Sub. 16-28 (No. 2) | 5.75 to 6.00 |
| Envp. Mla. (Prices based on large sheets untrim'd reammarked, in bdls.) | |
| **Wrapp. Mla. 35 lb. up—** | |
| No. 1 | 6.00 to 6.25 |
| No. 2 | 5.75 to 6.00 |
| **M. G. Sulphite and Kraft (other than Waxing)** | |
| Grade A-22 lb. | 7.20 to 7.40 |
| Grade B-20 lb. | 6.75 to 7.00 |

# ● JUST A MINUTE, PLEASE!
## UTILIZE WASTE MATERIALS
## LET NOTHING USABLE GO TO WASTE

We "telegraph" you herewith a few facts about the Bauer double-disc pulper—a stock preparation unit that salvages waste material.

Two opposed rotating disc plates rub, roll and squeeze the fibers with little cutting and shortening action. Type of plate dependent upon kind of stock and results sought. Full range of plate patterns for both 36" and 24" size pulpers.

With Bauer pulpers some mills have greatly increased their beater capacity. Some have reduced furnish costs. Some have saved considerable power. Others have accomplished all three of these objectives *plus utilization of material ordinarily rejected, greatest advantage of all in these days of world stress.*

Now "telegraph" us for the rest, and we'll cite mills and cases. *The Bauer Bros. Company, Springfield, Ohio*

***SALVAGE WASTE PRODUCTS***

*The* BAUER BROS. CO.
SPRINGFIELD, OHIO

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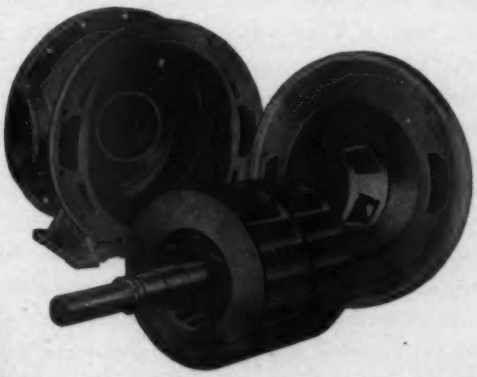
# SIMPLICITY



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**NASH ENGINEERING COMPANY**
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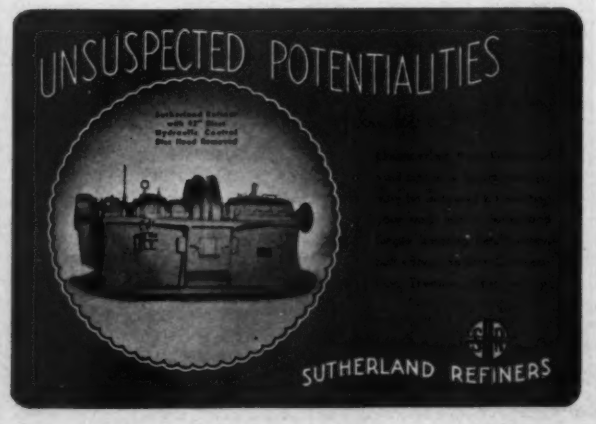
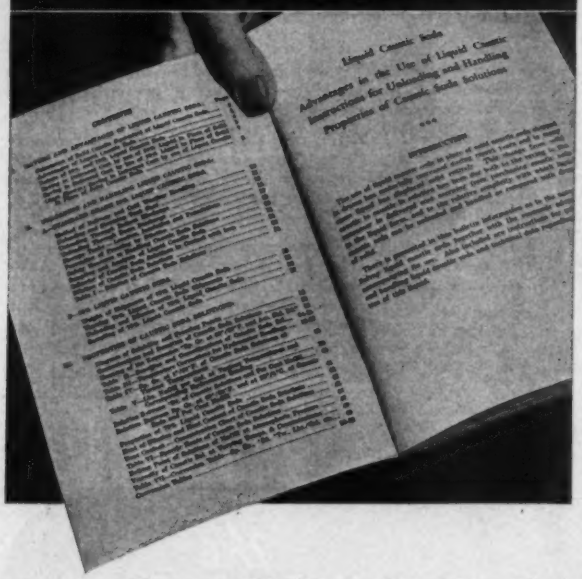


# BOOK OF THE YEAR

*...To The Man Who Needs Down-to-Earth Information On Handling Caustic Soda!*



If you are a technician or plant operator who is now "taking over" an assignment which necessitates a more specific knowledge of Caustic Soda than you previously required, *then write today for Solvay Technical Service Bulletin No. 6.*

This bulletin contains time-saving, factual information from which all sales talk has been eliminated. It is full of important tables, charts and other data on the handling of Caustic Soda. It is information which goes straight to the point... helps you improve efficiency, reduce man hours and increase production speed.

Solvay Technical Service Bulletin No. 6 on Liquid Caustic Soda is one of the series of Solvay Bulletins which are constantly being revised on the basis of new findings. For years this technical literature has had the recognition of plant operators, engineers and scholars who realize that such vital operations data concerning alkalies can only originate out of the breadth of accumulated experience Solvay has gained as America's oldest and largest manufacturer of alkalies.

FOR VICTORY BUY UNITED STATES DEFENSE BONDS AND STAMPS

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GLENS FALLS N.Y.

PULP SCREENS
WEIGHT AND CONSISTENCY REGULATORS
METERING SYSTEMS FLOAT VALVES

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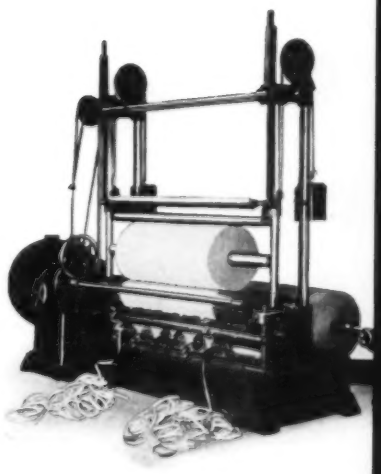

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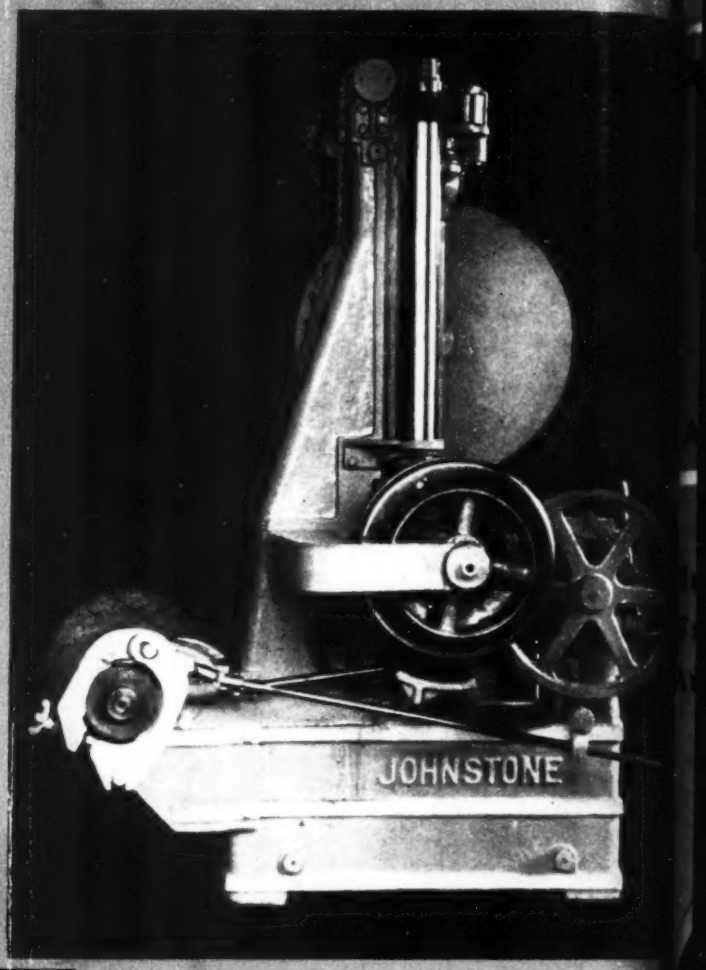


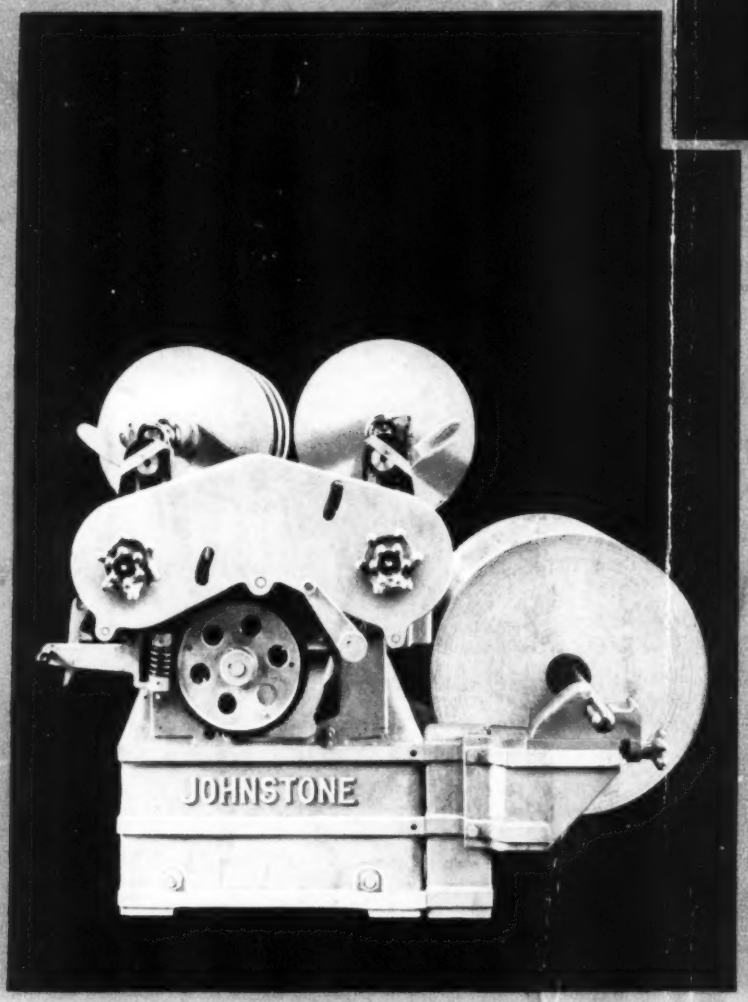


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